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## REVIEWS

*An Expedition of Discovery into the Interior of Africa, &c.* By J. E. Alexander, K.L.S. 2 vols. Colburn.

TOWARDS the end of 1833, the Royal Geographical Society resolved to expend a portion of its increasing revenue, in the prosecution of geographical discoveries. Guided, however, by a reasonable sense of economy, it determined on adopting only such a scheme as promised to yield some valuable results for a very moderate outlay; and after due deliberation fixed on the plan of an expedition to Delagoa Bay, to follow up the river Manissa, which flows southwards into that great estuary, in order to decide whether it was or was not identical with the river Mariqua, discovered in the interior by traders from the Cape. This plan was originally sketched in strict subjection to the condition of a moderate expenditure.

While it stood arranged, that, in order to avoid arriving on the eastern coast of Africa in the rainy season, the expedition should leave England if possible in the beginning of April, Captain Alexander, (who had undertaken to conduct it,) about the end of February, set off to Portugal, where he remained three months, thus rendering the postponement of the expedition for a whole year inevitable; and during his absence it was stated at a meeting of the Asiatic Society, that he was on his way to Egypt, the bearer of certain messages from that learned body to Mohammed Ali. Such indeed was the fact; but unforeseen circumstances compelling him to return home from Portugal, he again attached himself to the patronage of the Royal Geographical Society, and, abundantly provided with recommendations, he embarked for the Cape of Good Hope in September. Thus passed 1834, with various plans in continual fermentation, the results of which, however, were not geographical.

On the arrival of Capt. Alexander at the Cape, the Caffre war had broken out, and though of course it was scientific and not military employment which he had in contemplation when he embarked for South Africa, yet having been recommended as a supernumerary aide-de-camp to the governor, he readily and laudably girt on the sword in the hour of danger, and laid aside all thoughts of the undertaking with which he was in a special manner charged. Thus passed 1835, the buried scheme of an expedition to Delagoa Bay still germinating and throwing out an abundance of useful shoots, though without any promise of geographical flowers and fruit. In 1836, tranquillity being restored on the frontier of the colony, the Geographical Society expected to hear something of its projected expedition, but its traveller remained unaccountably silent: an explanation of his intentions was at length called for; and then, when the proper season for operations had passed over, he declared his readiness to execute what he had undertaken, forwarding at the same time certificates of the disturbed state of the interior, and of the inexpediency of proceeding to Delagoa Bay. Respecting these documents we shall only observe, that they manifested an unaccountable ignorance of facts in those who wrote them. We have the most distinct proofs, first, that perfect tranquillity reigned in Delagoa Bay, which was filled with British and American shipping at the time in question; and

secondly, that Capt. Alexander continued to affect an adherence to the original plan until the arrival at the Cape of Lord Glenelg's dispatch, disallowing the scheme of colonizing Natal, of which place he was about to undertake the provisional government.

The Geographical Society,—unable to understand the traveller who made no spontaneous objections to the task assigned to him, and yet remained inactive; who was so desirous to wear the distinctions, so loath to encounter the hardships attendant on their service,—wrote in consequence to Capt. Alexander to suspend his future operations: but it was too late. Capt. Alexander quitted the colony in the beginning of September; he directly violated the express injunction of the Society not to travel at their charge in the colony; he incurred an expenditure, more than double of the sum placed at his disposal; he rejected the plan, the execution of which was assigned to him, and adopting, without consulting his principals, another scheme more to his own taste, and having received the letter above alluded to, besides a letter of recall from the Horse Guards, he set forward on the expedition which he is now pleased to say “was performed under the auspices of Her Majesty's Government, and the Royal Geographical Society.”

On the 8th September 1836, the waggon of the expedition, well loaded with stores of various kinds, left Cape Town; our traveller's attendants were seven in number, of whom four were Europeans. A journey of twenty-three days brought the expedition to the Missionary station at the Kamiesberg, on the frontiers of the colony, where it halted five weeks. At the end of that time, causes which may be traced in the warfare of the colonial newspapers, urged it forward eleven days march to the Missionary station at the Warm Bath, about thirty miles north of the Orange River. There another halt of no less than seven weeks took place.

“It was convenient for me, (says our author,) to ‘set up my staff’ here on the banks of the ‘Hoom’ for a time, that I might wait for the thunder rains which fall about the beginning of the year, previous to attempting to penetrate further to the north. I got my people therefore comfortably placed in a large shed, whilst I occupied one of the three rooms of Mr. Jackson's house.”

The necessity of waiting for the summer rains might have been foreseen in Cape Town; and the fact, that the expedition started nearly three months too soon, gives rise to the suspicion that it was prompted by something else than a zeal for geographical discovery. After the expedition started afresh from the Warm Bath on the 18th January, its progress was for some time extremely slow, so that it did not reach Bethany, (formerly and we believe at present a Missionary station, though abandoned by the Missionaries at the time of Capt. Alexander's visit,) till March; and consequently, the first fourth of Sir James Alexander's journey, that portion of it which was performed with fresh cattle, on a beaten road, and with the aid of the colonial authority for the greater part of the way, occupied him six months,—the distance from the Cape to Bethany being in strictness but a six weeks' journey—while the remaining three fourths, to Whalefish Bay, then into the interior and back again to the Cape, with all the difficulties of untrodden ground and tired cattle, required but six months more. It is plain, therefore,

that the departure of the expedition from the Cape was, for whatever cause, a precipitated measure.

We cannot avoid remarking, also, that Sir James Alexander, himself a distinguished traveller, is extremely unjust to those adventurous individuals who have preceded him in the land of the Namaquas. He denies that Paterson crossed to the northern bank of the Orange river, which he could hardly do had he consulted that traveller's volume. He sides with those who deny the authenticity of Le Vaillant's second journey; but would it not have been more becoming in one travelling under the auspices of the Royal Geographical Society, to examine the point rather than to assume it? Our persuasion is, that in the earlier part of his journey, as far as the kraal of Henrick the robber, he followed the track of Le Vaillant; and we cannot help smiling at the cursory way in which he rejects the account of one whom he was particularly called on, having gone over the ground described, either to believe or to confute. Sir James Alexander appears also to be quite ignorant of the Dutch expedition sent into Great Namaqualand in 1761, by Governor Tulbagh, and of which an account was published in 1778. We lament to see one who travelled under the auspices of the Royal Geographical Society, not only marching, but even publishing without the instructions of that learned body. But our author's disregard of his precursors is most apparent in his parsimonious acknowledgment of the Missionary explorations. Some missionaries, he says, have laboured from time to time in the neighbourhood of the Orange River, and “one, the Rev. Mr. Schmelen, travelled some years ago through a part of Great Namaqualand.” Indeed! why the Rev. Mr. Schmelen penetrated as far as the land of the Damaras, nor is he the only one who has done so; for our author's “worthy friend,” the Rev. B. Shaw, accomplished the same journey much more recently. Nay, Mr. Jackson, with whom our author dwelt at the Warm Bath, traversed the same country as far as the Bull's Mouth Pass, which sounds so loudly in our author's pages. Why, then, has Sir James Alexander forgotten his host and his worthy friend, and singled out Mr. Schmelen as the one who travelled in Great Namaqualand? Doubtless he felt himself overpowered by our authority, and named Mr. Schmelen alone, because his journey alone was alluded to in No. 525 of the *Athenæum*.

A little beyond Bethany (lat. 26° 35'), the country, though generally reputed a desert, is really, after the rains, rich as well as beautiful.

“Again inspanning,” says Sir James, “we descended to a most beautiful plain, which waved with high white grass, like a harvest ripe for the sickle; there were numerous ant heaps among this, a sign of abundant pasture; clumps of green mimosa, and brown and deep red hills, three or four hundred feet high: altogether the scene was most delightful, and I highly enjoyed it, with the agreeable temperature of 75° at mid-day. Game was not wanting. We scattered ourselves over the country. The traces of zebras were seen, and then the fresh print of a lion's paw; presently the king of beasts was observed at a distance devouring a zebra under a bush; having had his belly full, he slowly moved off, and left half of his prey, which was immediately packed on bullocks and carried off for supper. Though it might appear very sporting and Nimrodish to say that I relish wild horse flesh, with its yellow fat, yet I

cannot bear it if I can get anything else. It is true that I can eat meat, 'done or under done, raw or cooked,' when hungry, and so can most men; but to say that I preferred coarse and rank food, which wild horse is, to good beef and mutton, would be (to use a vulgar expression) humbug!"

The family of a bastard Hottentot, named Jan Buys, who are settled in this part of the country, were induced to follow our author; and being chiefs of considerable influence, and well acquainted with the country, one of them speaking Dutch (the language of the colony), and another being the greatest of African hunters, they formed an important accession to the expedition, which now consisted of fifty men, with a flock of forty sheep, a herd of oxen, and a couple of horses. Henrick, the hunter, was a favourite of our author's, and must be described in his language.

"In the evening, Henrick came from his huts to visit me; he was a spare made and athletic Namaqua, of forty years of age, about five feet eight inches in height, nose low, but inclined to aquiline, teeth rather prominent, but covered with his lips; a good-humoured smile about his mouth, and altogether with a very amiable and intelligent expression of countenance. He was beautifully formed, deep chested, small waist, and muscular arms, thighs, and calves, without any extra flesh beyond what was necessary to give perfect symmetry to his figure. His feet were small, as is usual among the Namaquas, but his instep was particularly high, and even rose in a sort of knob in the middle: this may have added to his astonishing power as a runner. The reader must not imagine I indulge in a traveller's license when I say that Henrick could catch and kill zebras by fleetness of foot: I believe he has often done this; for I have seen him turn zebras towards the guns; and when I tell how he managed to catch them, I may be believed; if not, I must lie under an evil imputation, which I would willingly avoid—for, *Hora et semper*, now and always 'Truth me guide.' \* \*

"Henrick is rivalled now in fleetness by his eldest son, Jan, which would not be, says the father, if it were not for his own crippled arm. Lately, the two were out in pursuit of giraffes, and getting close to three, the father told his son to assist him in stabbing the last; but Jan said, 'No: let us attack the first and largest.' Which they did; and after a smart pursuit, managed to stab the first with fatal effect."

The route of the expedition lay up the banks of the Koanquip, which joins the Great Fish River. Between the two rivers rise the 'Unuma, or bulb mountains, from two to three thousand feet high, which lay on our traveller's right hand. The Koanquip, like the other rivers of this part of Africa, is but occasionally, and perhaps rarely, a running stream, and ordinarily only a chain of pools, which are capable, however, of refreshing many thousand head of cattle. Even when the beds of these rivers appear quite dry, water is easily found in them by digging. Their banks are generally overgrown with mimosas, willows, thorn-trees, tamarisks, and a kind of ebony, which form altogether a grateful shade, and often make the dry gravelly bed of the river the most agreeable road for the traveller. It is an extremely dangerous road, however, particularly towards nightfall, when the lions are sure to scour along it in search of the wild animals that resort to the watering places. The fine grassy plains near the Koanquip abounded in antelopes, ostriches, hares, tortoises, lynxes, hawks, &c., supplying endless amusement to the sportsman; and had Le Vaillant been there, they would have afforded the material of many a lively page to that zealous naturalist.

But it was not until the expedition reached the Bull's Mouth Pass, as the defile is named which leads through the chain of hills separating the waters running southward into the Orange River, from those flowing into the sea at Whalefish Bay, that the larger kinds of game, as the rhinoceros, gnou, dauw or wild horse, giraffe, and koodoo, were met with in considerable

numbers. Here the sheltered valley, between high hills, round the sources of the river Chuntop, where every species finds a suitable retreat, is so thickly stocked with a variety of wild animals, that it is regarded by the natives as the menagerie of their continent. Sir James Alexander, a practised author, who knows how to make the most of his lions, enlarges with such manifest pleasure on the feats of the hunter in these wilds, that in order to give our readers an adequate idea of his volumes, we feel that we must allow our Nimrod to describe his sport in his own language.

"On the left of the plain was a broad and winding belt of high trees and bushes, indicating the course of a river, the Chuntop (or that which in running is suddenly checked): this entered a craggy opening in a flat range of mountains stretching across the plain to the north. The notch in the range where the wooded Chuntop disappeared, was the anxiously looked for Kopumnaas, or Bull's Mouth Pass—so named from its being full of dangers, like the Valley of the Shadow of Death. I now girded up my loins for the chase, and I burned with desire to slaughter some of the larger game, as much to feed my fifty followers, who ate at the rate of two sheep a-day, as for mere sport. The people were divided into several parties, and we rode towards the foot of the mountains, where wild animals are always rife. We were not long before we saw a cloud of dust, which proceeded from a large troop of wild horses; dismounting, and extending ourselves, we approached them under cover of the bushes—they took the alarm—started off—passed through between us—galloped backwards and forwards—halted and gazed, and three fell under our fire in the course of as many hours' hard exercise on foot. The moment the first, a full grown stallion, fell, and had stretched his powerful limbs on the plain, with the agonies of death in his eyes, half a dozen of the hunters collected round him; some of them brought dry sticks and made a fire; while the others cut him open, and taking the half-digested grass from his stomach, they squeezed the moisture from it into their mouths in the intensity of thirst; then cutting out the liver and roasting it, they made their breakfast off it; and, lastly, fitted themselves with shoes from the warm hide. A troop of that most magnificent antelope, the koodoo, next occupied us for a little, but before we had time to secure any of them, we intercepted a dancing flock of springboks; and again, by sharp running and quick firing, three of them were also added to our larder. Our blood was now fairly up, and turning towards the mountain two large grey objects were seen, apparently disturbed by the 'chattering of the muskets'; they ran a short distance among the bushes on the lower slopes, and then turned to look round them—these were two black and double horned rhinoceroses, covered with dried mud from the pools of the Chuntop, in which they had been wallowing. We approached these dangerous animals with some caution, crept upon them, and got two or three flying shots at them; but unless they are taken standing, with deliberate aim at the backbone, or behind the jaw, good balls are thrown away upon them; not that their hide, though more than an inch thick, is impenetrable in other places to lead and pewter bullets, (hard and heavy), such as mine were, but because the rhinoceros runs away with a bushel of balls fired through his ribs. In his side they seemed to make no more impression on him, at the time of receiving them, than so many peas would, though he may die from them afterwards. So our two first rhinoceroses, being continually on the move, escaped from us though we tickled them roughly."

The formidable animal here alluded to is thus described at length:—

"The black rhinoceros, whose domains we seemed now to have invaded, resembles in general appearance an immense hog; twelve feet and a half long, six feet and a half high, girth eight feet and a half, and of the weight of half a dozen bullocks; its body is smooth, and there is no hair seen except at the tips of the ears, and the extremity of the tail. The horns of conereted hair, the foremost curved like a sabre, and the second resembling a flattened cone, stand on the nose and above the eye; in the young

animals the foremost horn is the longest, whilst in the old ones they are of equal length, namely, a foot and a half or more: though the older the rhinoceros the shorter are its horns, as they wear them by sharpening them against the trees, and by rooting up the ground with them when in a passion. When the rhinoceros is quietly pursuing his way through his favourite glades of mimosa bushes, (which his hooked upper lip enables him readily to seize, and his powerful grinders to masticate), his horns fixed loosely on his skin, make a clapping noise by striking one against the other; but on the approach of danger, if his quick ear or keen scent make him aware of the vicinity of a hunter, the head is quickly raised, and the horns stand stiff and ready for combat on his terrible front. The rhinoceros is often accompanied by a sentinel to give him warning, a beautiful green-backed and blue-winged bird, about the size of a jay, which sits on one of his horns."

Of the numerous stories of the chase and various anecdotes related by our author in this place, we can find room for one only which is free from the embellishments of Hottentot fancy. His Portuguese servant, Antonio Pereira, wandered, gun in hand, from the rest of the party, and being absent for a whole night, caused much uneasiness. In the morning it was found that he had climbed a tree not far off, having mistaken the two fires kindled by his companions for the glare of a lion's eyes. The Hottentots of our traveller's suite, in the meantime, cared little for the lions; being liberally supplied with powder and ball, they killed game, and feasted from morning till night. Our author often breaks out into expressions of surprise at the gastronomic powers of his people. A large rhinoceros, twelve feet and a half long, at last seemed to glut them; "flesh, flesh, was on every side, and the insatiable stomachs of the Namaquas were at last content."

The country throughout the pass was extremely beautiful; and a little way down, on the banks of the Chuntop, were fig-trees, fifty or sixty feet high, loaded with ripe and very palatable fruit. Bushmen guides were procured to lead the expedition over the desert plain which lay before it, and point out the water, but being incautiously frightened they fled, leaving our author and his Hottentot hunters to shift for themselves. We can hardly suppose that the latter found much cause for anxiety in their situation. There was a desert of only fifty miles without water to be crossed, but by neglecting to water the cattle at starting, and to explore the country in advance, our author contrived to work this stage of his journey into an admirable and artist-like contrast with the preceding. It was now all famine, as it had been then all feasting. He had, to be sure, meat in plenty, some biscuit, and a few quarts of water, but, nevertheless, he thought his situation desperate. Staying, therefore, at the waggon with a few of his people, he sent the others on with the cattle to look for water. They, of course, returned on the second day, and the expedition moved on towards the river Kuisip. Notwithstanding that our author "thought his fate sealed in the parched and trackless desert of Tans," yet that desert was eventually crossed without any injury to any of the party, and, indeed, without any further loss than what is attributable to a total want of management and direction. The waggon was abandoned for a time, the tired cattle being unable to drag it over the sand hills.

The route now turned westward, along the course of the dry river Kuisip towards Whalefish Bay, the intended limit of the exploration; and where our author, with great skill, arranges all the dark shades of his picture. Here, again, he hints at famine; for "a sheep was made to go a long way," and he cries "twenty guineas for water; to-morrow may be our last evening." He reached the shores of Whalefish Bay on the

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19th of April, seven months after he had left the Cape, and only three from the time of his starting from the missionary station near the Orange River. Soon after his arrival there, two American whalers entered the bay, and replenished his store of biscuit. He expected, also, to see there one of Sir P. Campbell's squadron from the Cape, "by which," as he expresses himself, "I might be set down at Benguella, and from thence travel east." And must we then believe that Sir James Alexander, travelling under the auspices of her Majesty's Government and the Royal Geographical Society, was wholly at liberty to undertake any wild project that entered into his fancy? Must we believe that having spent, in reaching Whalefish Bay, seven of the twelve months for which he had made his arrangements, he intended to desert his people, and without any means for re-equipping himself for an arduous undertaking, to attempt that which would be in any case impracticable? Undoubtedly he intended so to do; and we most sincerely congratulate his friends on the frustration of his geographical zeal, which enabled him to return to the Cape at the very time on which he had previously calculated.

The obscure accounts which Sir James Alexander received at Whalefish Bay respecting Hottentot nations living further north, have already appeared in our pages, (No. 525). Our author now repeats them in the following manner:—

"I of course questioned Quasip regarding the Nubees, or red people, to the north of the bay, whom he had once visited; but I could get no other information from him than this, that by good luck he had passed by the Damaras of the Swakop, had gone a month to the north of the bay, and had there fallen in with the great red nation, who were very friendly; spoke a different dialect from the Namaquas, but that he understood them; and that they were distinguished by allowing their woolly hair to grow long. I asked him if he would go again to the Nubees. He said that it was inconvenient for him to leave the bay at present, having just now come off a journey."

After reposing for three weeks at Whalefish Bay, our travellers started eastwards, along the course of the Kuusip. Having good guides, they never lacked either water or game; and, indeed, the hardships of the expedition were now completely at an end. A journey of twelve days brought them into the country of the Hill Damaras, a tribe of bushmen, who speak the Namaqua language, but are not of Hottentot race, and of whom we have the following account:—

"These Hill Damaras were about five feet seven inches in height, and in colour and feature had all the characteristics of the negro, even to the projecting shin bone. They came with long staves in their hands, and without arms, in token of friendship and confidence, though perhaps their weapons were not far off. Their hair was peculiar: that is, it was cut off quite round the head, and an inch above the ear, leaving only the hair on the top of the head—in the manner of the Roundheads of the Cromwellian period. They wore short karosses of deer skin, and softened flaps of skin before and behind, to cover their nakedness; and in the hind flap, which was longer than the fore one, there was a pocket for holding roots, &c. They wore soles or sandals."

A little farther on, and travelling through a fine country, the expedition came to Niais, a village of mixed population, the Hottentot Aramap, who had recently conquered all this country, having settled here with his Namaqua followers in the midst of the Hill Damaras. The strangers here found a hearty welcome.

"On the 24th of May," says our author, "Aramap's brother, with several other Namaquas, came on riding oxen, and in their best apparel to meet me, and to conduct me to the great chief. I left Names with them. We passed over one of the finest plains I had seen in Africa, covered with sweet grass, and with high trees, and bushes dispersed on it in detached groups, and among which wild horses were seen. We approached the banks of a river with a strange

name, for such a scene, the Kei-kurup, or 'First ugly river,' and we found its banks rather steep, and with pools of water in its bed, which was about seventy yards broad. Looking across it, there appeared to be a great town of Namaqua and Hill Damaras huts, round and conical. The whole plain was covered with huts, in hamlets of five and six together, and cattle and sheep-kraals were beside them. We had got then to 'the fertile plains and fine cattle country,' which were laid down from native report on Arrowamith's map, and I was much rejoiced to think that the ship of war had not come for us, or we should have missed seeing the three hundred miles of new country we had just passed over, after leaving Walvisch Bay, and the very fine region for grass and game we were now in. The landscape, besides being beautiful from the abundance of trees and pasture, (amongst which large herds and flocks were seen grazing in every direction,) was imposing by reason of the picturesque and primitive mountains to the north and east, and placing the town of Niais (or very black) as it were in a vast amphitheatre. • • After enjoying the view of the detached mountains and of the plains at their feet, and calculating that in the scattered town of Niais, there must have been about one thousand two hundred souls, I crossed the Kei-kurup, and halted on the other bank, where I directed the people to unload the cattle. Aramap now came from his hut attended by several of his old people. He was a little, modest looking man, with the usual Namaqua features, as to high cheek bones, narrow eyes, and prominent lips, but his nose was slightly inclined to aquiline. He had nothing in his outward man to denote the bold and intrepid warrior, who had beaten the formidable tribe of Kamaka Damarap, and had thus saved the Namaquas of the Upper Fish river from annihilation. But Aramap, like other great commanders, though short, is distinguished by a daring mind, by good judgment, and by very active habits. He said that it was unsafe to 'pack off' near the river, for lions swept along it almost nightly, and had lately carried off both sheep and cattle from his people; accordingly we carried up the baggage, with assistance, to a clear space adjoining Aramap's hut, who erected mat screens to shelter the people, and who did all in his power to render us comfortable."

Sir James Alexander labours hard to show that it was impossible for him to advance farther to the north or to the east. He could obtain no guides for the former direction, and in the latter there was a trackless desert. But when we consider, that even if no obstacle had opposed his progress in those directions, he yet had not unlimited means at his command, and that all his arrangements compelled him to return homeward, we cannot help thinking that his enumeration of difficulties is supererogatory as well as unsatisfactory. Indeed, it is plain that a prudent bias, of which he was wholly unconscious, counteracted his ardour of discovery, and rendered him unusually cautious. The Kamaka (that is, cattle) Damaras, or as he is pleased to name them, the Damaras of the plains, were well worthy of his curiosity. They make iron javelins and copper ornaments, and are said to possess a fertile country.

We have no space for descriptions of lion hunts, of stratagems to kill the ostrich, or for tales of young Hottentots carried off and tenderly educated by baboons. We find it time to bring our journey to an end like our author, who, determined not to be again on the verge of starvation, increased his flock to 160, and provided himself with a number of fresh oxen. On the last day of May he commenced his return, which for some days was through a fine country. But the details of the journey back may be here omitted, and we shall only observe, that our traveller, staying a fortnight with the Buys, reached Bethany in six weeks, and then proceeding very slowly with tired cattle in the latter part of his journey, arrived at the Cape in two months more, whereas in his journey up he spent six months between the Cape and Bethany.

In considering the general results of the expedition, of which the history is before us, we cannot help being struck with the total absence of scientific observations. Sir James Alexander was furnished with instruments, as he informs us, but it is evident that he made no use of them. Nor can we find in his pages any information whatever of an accurate or substantial kind. These remarks could be extorted from us only by the consideration of what may be justly expected from an expedition performed under the auspices of Government and the Royal Geographical Society. Sir James Alexander has explored about 150 miles of new country, and never went beyond the dominion of the Namaquas. He made a journey, it is true, of 2000 miles through deserts, and at considerable expense, till he arrived on the frontiers of another native race, and then having asked a few questions respecting them, he journeyed back again. Without feeling any wish to disparage his labours, or to insinuate a doubt as to the discernment of those under whose auspices he performed his expedition, we can safely say, that the geographical information which he has brought home has been dearly purchased.

*The Life and Times of Louis the Fourteenth.* Vols. III. & IV. By G. P. R. James, Historiographer to Her Majesty, &c. Bentley.

We English, it is admitted, manufacture capital locomotives, and our railroads, and steam-guns, according to Mr. Urquhart, are apt to "stiffen the natives" of the East; but our "notions" of History, (to use an American phrase,) are not such favourites abroad; and if they set our French and German neighbours staring, it is not, assuredly, the stare of admiration. So, too, our hardware is the very *beau ideal* of what iron should be, and our Manchester goods are the best that can be had for the money, all the world over; but our philosophy, got up exclusively for home consumption, is a perfect drug in every foreign market. The second of these peculiarities will go far to explain the first; for, if history be philosophy teaching by example, such as is the teacher, such must be the doctrine. So deplorable, indeed, is the state of moral science in these countries,—so narrow, one-sided, and superficial are the ideas prevalent among Englishmen, on all that concerns the intellectual and moral nature of man, that a comprehensive history of human actions, connecting causes with consequences, and opening the social development of a community, would be "caviare to the general;" and, probably, would not repay the expense of printing.

Such being the case, we were, perhaps, somewhat hard on Mr. James, when, in our notice of the earlier portion of the present work, we dwelt upon the little philosophy he had brought to its composition. It may be, that he knew his public; it may be, that he considered (and justly) that anything like a large expense of thought would not only be "a wondrous waste of unexampled goodness," but a positive evil,—as effectually rivetting his volumes to the bookseller's shelves, as the material and physical chains which provided against the future propensities of bibliomania in the old libraries of the Middle Ages. Still, the truth must be told, that Mr. James's book continues, to the end, a true John Bull history,—that he ceases not to look upon the Grand Monarch and his times with a thorough Englishman's eye. There is no history, notwithstanding, that requires to be written more completely in the spirit of the people it treats of, than the history of France; and there is no portion of French history that leads to greater error, when otherwise conceived, than the part on which we are now employed. Certain it is that the influence of what has been called the Au-

gustan age of France has more powerfully modified the after condition of Europe, and done more to determine the course of its civilization, than any other series of events which can be seized upon; and we cannot give a more satisfactory proof that Mr. James (if he had any higher object than to make a reading book for the idle and unthinking,) has missed his vocation, than by stating that the leading interest of his volumes is concentrated on the campaigns of Louis and his generals. The true history of that epoch lies in its literature, its philosophy, its social manners, and its court intrigues,—in the revolution that took place, in the balance of the constituting powers of the people—in the development of a public opinion,—and the influence which society obtained over all that was positive and absolute in the religious and political institutions of the government. To do justice to this epoch requires a grasp of mind both extensive and vigorous; and an intimate feeling of the spirit of the age. It requires not merely a thorough acquaintance with the facts, but a power of entering into the principles of national action, and of embracing the whole series of moral events in one generalizing *coup-d'œil*. That Mr. James is deficient in these requisites, that he does not fully understand either the persons whom he judges, or the atmosphere in which they lived and moved, or comprehend the causes which made them what they were, is no singularity in him. We have nothing in our historical literature on the subject of France, that makes the smallest approach to the desired excellence; nothing deserving of more than contemptuous neglect. We should not, therefore, thus a second time, have dwelt upon a defect which can scarcely be considered as personal, were it not for the few words in the title-page, which invest the author with a higher character than that of a book-making writer for the mediocrities of the passing hour, and which render his notions of the mode in which history should be written, of some permanent importance to the public. The 'Historiographer to the Queen,' the commissioned recorder of the times we live in, should be no simple and unapprehensive annalist, no servile echo of the current prejudices of his age and country; and if Mr. James intends that his office should be more than a mere sinecure, we cannot too earnestly recommend him to study the contemporary historians of the continent, and to familiarize himself with the loftier speculations, and more enlarged philosophy of the foreign schools.

It is a great defect, arising from the low point at which the author has stationed himself to survey events, that he uniformly sees too much in the subject of his biography; that he attributes too exclusively to the personal qualities of Louis, consequences which belong to the whole series of surrounding circumstances. The importance of Louis XIV., the prominence of his person on the picture of his times, depended, as we have already said, like that of Napoleon, principally on his dovetailing with the necessities and the tendencies of the people over whom he reigned. It was not simply that he commanded, but that all around him were prepared to obey, and would, in all likelihood, have taken a similar direction had he not been present to control them. The foundations of the system, which he carried so powerfully into action, were laid before he was born; the part which he was to play was his inheritance; and, notwithstanding his affectation of mastery, his *l'état c'est moi*, he is, on a close inspection, as to all things that did not touch his appetites, his passions, and his vanity, very evidently the tool of his successive ministers and mistresses. This magnified view of the protagonist of Mr. James's imagination, has begotten in the writer something like a no-

velist's affection for his hero, disposing him to unconscious eulogy—at least, misleading him into a continued strain of general laudation, anything but borne out by the particular facts, which he sometimes displays with a just censure. Thus, he would fain persuade himself and his readers, that, bating the dragoonades and the revocation of the edict of Nantes, Louis was not a fanatical persecutor—that the murders and the burnings in the palatinate were not his, but his ministers' acts; that, maugre his abominable treatment of Fouquet, of the man in the iron mask, and others, and the uniform abstraction of the accused from their natural judges whenever the state was, or imagined itself, concerned—the growth and establishment of the usage of *lettres de cachet*,—he was neither cruel nor personally tyrannical. Why, the very devil himself, we are told, is good-humoured when he is pleased; and if Louis is not to be debited with the things ill done in his reign, neither should he be credited with those which were good: at all events, if he was the blind agent of his ministers, he was *not* the mainspring of government and influence which Mr. James imagines. This error of judgment is the more striking, inasmuch as the author's sympathies are not exclusively with monarchical government, nor at all with a Popish policy. He is, besides, honest-minded to the extent of his powers of judgment, and he is moved by a sensitive respect for moral right according to his apprehensions of where it lies.

If this criticism be correct—if Mr. James has brought to this publication, too exclusively, the qualities of the *littérateur*, and is deficient in the requisites which make a good historian, it is needless to add, that his work affords few new lights concerning the men or events he has undertaken to elucidate. Indeed, the utmost attempted is a faithful collection of the memoir writers and annalists of the day, and their reduction into a plain English narrative. This is so far a good: for the absence of an unjustified pretension is a merit; and had Mr. James attempted to lead opinion beyond the mere surface of things, we fear that he would have misled. All people cannot know all things; and we mean no disrespect in conveying our opinion, that he wants that course of reading and reflection which would have enabled him to point the moral as well as adorn the tale he has undertaken to tell. Frequent instances of this defect, where the narrow basis of his individual judgments have led him astray, will discover themselves to an experienced eye. We take the first that offers. In a note on the lavish expense of Louis XIV. in building and decorating Versailles, he justifies it, because (he says) it is "entirely poured back into the hands of the people of France as the price of labour and production. Very little but a portion of the marble was brought from any other country; and though in the week ending the 26th of August 1684 we find that the sum of two hundred and fifty thousand francs had been laid out in the park and palace, yet twenty-two thousand men had been employed in the exertion of their best faculties." This fallacy, wholesale though it be, and open to the refutation of the very tyros in political economy, may perhaps be a mere venial slip of the pen; and we do not insist upon it for the sake of any grievous consequence affecting the general view of the subject, for these expenses are justly stated as mere trifles in the sum total of regal extravagance; but we notice it as an intelligible instance of the necessity of habits of philosophical reflection, and of some acquaintance with moral and political science, to the formation of a sound opinion even on so commonplace a topic—as a proof how easily historical criticism may sink into twaddle when it should

awaken the intellect and exercise the acumen of the reader.

Having said thus much, it is but just to add that Mr. James has bestowed reasonable labour and industry on his compilation; and if we consider his volumes as addressed to that portion of the British public to whom the originals are not accessible, and who, setting aside the philosophy of the subject, are desirous only of obtaining some outline notions of the life and times of Louis XIV., we are bound to add, that they will answer that purpose; nor do we doubt that there exists a body of English readers to whom the information thus afforded will prove new and welcome.

*Arboretum et Fruticetum Britannicum; or, the Trees and Shrubs of Britain, Pictorially and Botanically delineated &c., with their Propagation, Culture, Management, &c.* By J. C. Loudon. Longman & Co.

THE English gardener is the best in Europe; the English forester the worst. This, with few exceptions, is undoubtedly the fact. Nowhere has art succeeded in struggling more successfully against natural difficulties arising from an ungenial climate, than in English gardens; nowhere has art more generally neglected the advantages of a favourable climate than in English woods. The fruit and vegetables in our markets, and the flowers in our forcing houses are unrivalled; the trees in our parks, and the bushes in our shrubberies, are in too many cases only an evidence of ignorance and neglect. Of this the public parks of London are sufficient proof, without seeking further. One would think, that the only beautiful tree which will bear our climate is the elm, for little which is worth seeing except elms is to be seen in them. The beautiful species of *Acer*, the gigantic *Juglans*, the noble species of *Quercus*, *Alnus*, *Betula*, and many others, are as if they existed not; one may ride from St. James's Palace to the Regent's Park Barracks, without finding a single evergreen tree; and by some fatality, where attempts have been made to vary the scene by the introduction of the Plane tree, it is the ugly American species, which will not bear our climate; that has been selected, instead of the beautiful Oriental Plane, which is as hardy in England as in its native plains, in Western Asia. This is the more extraordinary, considering how large a portion of the wealth of Great Britain consists of timber, and can only be accounted for by ascribing to the managers of forest land, a degree of ignorance which it is uncharitable to impute to them. Possibly Evelyn's system has been looked upon as a concentration of all arboricultural knowledge, as *arceum opus* beyond which it was in vain to seek.

Mr. Loudon's object has been to enable the landed proprietor to avail himself of the discoveries of modern science, and to show him the real value of the many new species and varieties of trees and shrubs now in this country. He has performed his task with great industry and perseverance, the results of which are eight octavo volumes, containing 2694 pages of closely printed letter press, 297 figures of plants, and 2546 wood-cuts. To all persons interested in the embellishment or improvement of estates on a large scale, and to that still more numerous class, whose forest-land does not extend beyond a few acres of shrubbery and plantation, this work is of great value, as a book of reference, for there is scarcely any subject upon which information can be required, that is not to be found in its pages. The appearance of the plants themselves, the value of their timber, the kind of soil they require, the manner of multiplying them, their periods of flowering and bearing fruit, the climate most favourable to their growth,



their botanical distinctions, are all discussed in ample detail; there is even poetical, traditional, and legendary matter for those who have a taste for the ideal, as well as the useful; and finally, the market price at which the species can be purchased is introduced. So useful a book upon trees and shrubs, is not to be found in any language; and it is not too much to say, that it deserves to form a part of the library of every country gentleman.

*Journal of an Expedition from Singapore to Japan.* By P. Parker, M.D. Revised by A. Reed, D.D. Smith & Elder.

ALTHOUGH this voyage to Japan was somewhat like the memorable expedition of the king of France, who—

with his gallant men,  
Marched up the hill, and then marched down again:  
yet so scanty is our information respecting the Japanese empire, that the smallest addition is welcome. The object of the voyage was to restore to their country seven shipwrecked Japanese, and, by means of three of them, who had been educated in England, to create an opening for missionary labours. Mr. Parker joined the expedition as surgeon, and took with him not only a stock of medicine, but a supply of vaccine virus, and a treatise on vaccination, translated into Chinese by Sir George Staunton. In order to meet Mr. Gutzlaff, the ship first sailed to the Loo Choo Islands, of which Captain Hall has given so fascinating a description. Mr. Parker remained too short a time in the harbour of Napeakeang to obtain much information from a people so unwilling to hold communication with strangers.

\*The Loo-Chooans have always refused, as far as possible, to furnish information respecting their country and laws. They cheerfully provide the vessels of foreigners with such refreshments as they can afford, but will receive no remuneration. They say they have no money, and therefore need none. This policy is probably adopted to show their unwillingness to have their harbour a rendezvous of foreigners.

To take away every pretence for hostility, the ship had been stripped of her cannons and military stores,—an unwise proceeding, because semi-barbarous nations are often provoked to commit outrages from mere consciousness of their superior power. The people of Japan seemed anxious to become acquainted with the strangers.

"We had been at anchor but a short time, before fishing-boats came to us from all parts of the harbour. The people were very timid at first, but gradually approached as we beckoned them to the gangway. A second boat came alongside, and an old man of sixty came on board, crouching servilely. As he led the way, the deck was soon covered with natives: some of them carefully surveyed the magnitude of the vessel, and stood aghast as they looked up to the top of the masts. They were invited into the round house, where Mr. and Mrs. King were sitting, but manifested no great curiosity at the sight of a foreign lady. They were treated with some sweet wine and other refreshments. Whatever they received, they carried to their foreheads and made a bow. Few cared for the wine, but the ship's bread was seized with avidity. A father having taken a piece, went to the boat and brought up his little son, twelve years old, to receive another. All, Athenian-like, were eager for some curiosity, but were reluctant to impart of their own, e.g. pipes, fans, &c. Mr. Williams obtained a writing apparatus, consisting of a few hair pencils in a brass sheath, worn by the side, the only trinket they would give. A man with severe rheumatism, another with lippitude, and others who had cutaneous diseases, were premeditated for, and one requested the extraction of a molar tooth."

Far different were the feelings of the Japanese government. Without the slightest notice, an attack was made on the ship.

"During the night cannon had been brought from the fort and planted on the opposite shore, whence they commenced firing, as soon as they could well see the ship. Captain Ingersoll gave orders to weigh anchor immediately, presuming they would be satisfied when they saw us getting under weigh. A white flag was hoisted to no purpose; they fired faster than before."

The Captain next proceeded to a southern port, where, for a time, affairs wore a very favourable aspect.

"At eight A.M. saw the natives assembled on the beach, and a boat full of men coming off, among whom, to our agreeable surprise, we saw the two Japanese in European dress. As the boat came near, we recognized one, with sword and sabre at his side. He was an officer, a middle-aged man, who carefully maintained his dignity, scarcely noticing the ship, or betraying any curiosity. He was obliging, and had brought a pilot to conduct us to a temporary anchorage, until communication could be had with higher authorities, when they would conduct us to a safe harbour. He said the country belonged to the prince of Satzuma, and that a boat had already been despatched to Kago-sima. He took Mr. King's despatches for the Prince, including those prepared for the Emperor of Yedo, and said a return would be received in three days. At two P.M. an officer returned the communications delivered in the morning, which we hoped had been forwarded to Kago-sima, the capital of Satzuma, saying a messenger had been despatched to the prince, that a high officer would visit us the next day, and that he had brought another pilot to conduct us to a harbour for the night. This officer, about fifty years old, was so sea-sick that he did not come on board, but cheerfully accepted some medicines for his sickness. Two boats with large cisterns of water were sent off immediately, but a squall prevented our taking it in. Fruits, &c. were to come the next day, though a recent famine in Japan had rendered all provisions scarce. The people informed our Japanese, that in the seventh month of the last year (July 1836) they had a gale of thirteen days, destroying all their crops. Ewacketchy went ashore, and said he was received with as much hospitality by the magistrate, as he could be by his own family. He attributed our failure at Yedo, to not letting him and his companions communicate with their countrymen."

A change of policy, however, soon became apparent, though the cause was undiscovered.

"A boat with fourteen men came off with water, under the care of an officer with two swords, who neither came on board, nor permitted any of the men, though they very much desired it. Before the water had been all received, there came on a fresh gale from the south-east, blowing directly into the harbour, and they were sent ashore for a pilot, as the captain was not willing to risk the ship longer in that situation, supposing as it was, it would be necessary to slip the cable. The prohibition to come on board ship was the first symptom we noticed of a change of policy towards us. The officers, however, had previously made a particular request that their persons and sabres might not be touched. The latter were sacred, and to be unsheathed only to cut off heads. On a former occasion I had partly drawn one from its scabbard, the edge was keen, the blade not highly polished. The officer saw it, sprang forward, returned it in an instant, and passed it through his girdle. The hilt of their sabres has no guard."

Hostilities soon followed:—

"All was quiet during the night, but it was the calm that precedes the storm, and a fresh confirmation of the saying that the Japanese are never more to be feared than when they appear the most friendly; for then they are seeking an opportunity to execute their treacherous intentions. At half-past seven, A.M. a fishing boat, with half-a-dozen men came off, and at some distance, told the Japanese on board, that the ship had better put to sea, and said something of the officers firing upon us. Immediately warlike preparations were seen on shore. Their portable forts were four or five rods long, and as many feet high. A horizontal stripe of white canvas apparently, alternating with one of black, each two or three feet wide, formed the front, and at the end were large concentric circles of black and white stripes, six or

eight feet diameter. Two of these forts were discovered at first just to the north of the village, Choogor-mutzu, and a yellow flag hoisted within. The men were very busy in the forts. Directly a similar preparation was made on the south of the village, opposite the burying ground. Our Japanese believed they were capable of turning musket shot, and even cannon balls. \* \* All doubt of their design was soon dispelled, when we saw a troop of several hundred soldiers in full speed upon the beach, making for a defile on the high bank, through which they ascended to the shelter of the fort opposite the burial ground. They had badges upon their backs which resembled knapsacks, except they were much broader, and came up higher on the shoulders. No sooner were they behind the fort than they commenced a promiscuous fire of musketry and artillery."

Mr. Parker believes that the Japanese people, generally, are anxious to open commercial communications with Europeans,—and speculates, in rather a more warlike style than suits a missionary, on the propriety of forcing a trade. Sir Stamford Raffles appears to have taken much wiser views: he proposed to establish a factory in some place frequented by the Japanese junks, and give their merchants an opportunity of buying if they pleased. It was by this policy that the lucrative trade of Singapore was established; and the experiment would have been tried at Batavia, but for the incomprehensible blunder of abandoning Java to the Dutch.

*Dispatches, Reports, &c., of the Ambassadors of France in England and Scotland, &c.*—[Recueil des Dépêches, Rapports, &c. &c.] Correspondence of De la Mothe Fenelon. Vols. I. & II. [Second Notice.]

In the thirty-first dispatch De la Mothe notifies that the correspondence of the Catholic lords with the French and Spanish ambassadors continues; and soon after we find the Queen of Scots earnestly entreating the aid of the French king: meanwhile the young Prince of Navarre (afterwards Henri Quatre) who had placed himself at the head of the Huguenot party, solicits aid from England, which seems to have been afforded. The affairs of the Queen of Scots now again occupy the dispatches, she being accused by Norfolk of having ceded to the Duke of Anjou her right to the English crown. This she peremptorily denies in a letter addressed to Elizabeth, from which the following is an extract:—

"I assure you, on my conscience, honour, and credit, that I never made any contract with him, nor other person for anything, nor ever had the intention of doing aught to your prejudice since I came to years of discretion, neither anything so ill advised for this kingdom and for myself as to make any contract or conveyance, of which I will give you such proof, assurance, and security as you may please to require, as the Bishop of Ross will tell you more at length; praying you to believe it, and to excuse me, for I am in such weakness as not to be able to write to you according to the subject or my will, only I am enforced to give you the testimony of my hand,—the which I call God to witness!"

In reference to this charge, Charles, on the 10th of July, sent forth the following declaration, in which, "on the faith and word of a king," he affirms, "that the said cession and donation of the right and title which our said sister-in-law, the Queen of Scots, is pretended to have made, has never been made by her, nor any other having power or commission from her, in favour of our said brother, and that it has not been approved by our holy father the pope." On the 17th followed a declaration of Anjou himself, in almost the same words, denying the truth of the assertion: "Upon this the editors truly remark, that there was great reason for the French government, at this juncture of affairs, to deny what, however, was well known to have taken place; and we may also

remark, that both Charles and his brother might perhaps consider themselves sheltered from the charge of actual falsehood, inasmuch as the name of Anjou was never mentioned in the acts of donation: but what can be said for Mary, who, by appending the words "nor other person," actually called God to witness an absolute falsehood! There are three acts of donation now existing among the "Archives du Royaume," each with Mary's signature attached to it, and each witnessed by Clause and Bourdin, and all granting "to the King of France who is or shall be," the kingdom of Scotland, and all other collateral rights which she may possess, should she die without heir. In the first of these she gives,—

In pure and free donation, made in case of death to the King of France, who is or shall be, the kingdom of Scotland, with whatever belongs and attaches to it, besides all and every right which may or can, formerly or for the time to come attach and belong to the kingdom of England, (eres et pour l'avenir comparter et appartenir au royaume d'Angleterre).

It is difficult to account for the Duke of Norfolk putting himself forward on this occasion as Mary's accuser, when, only two months after, De la Mothe mentions his proposed marriage with her as having been for some time under consideration. Was it that Cecil's party originally brought forward the charge, and that Norfolk took it up publicly to afford her a full opportunity of denying it? or did her friends intend that she should affect to yield up all right to the English crown, the better to pave the way for Norfolk's proposed alliance? The whole episode of Norfolk and Mary is indeed one of the most singular passages in the history of that queen. That Mary ever intended to accept him for her husband is unlikely, but by affecting a willingness to do so, she attached the first subject in England firmly to her interests; and through his influence, as we have seen, became the rallying point of the Catholic nobles of England. During this time we find from De la Mothe's dispatches, that she was urgent with the King of France to demand either that she should be sent back to Scotland, or allowed to return to France, and also that he should secretly send succours to the castle of Dumbarton. The proposed marriage, however, seems to have been approved by France; for De la Mothe soon after, writing to the queen-mother, says,—

I have managed this affair so well that he, in person, and she, by the Bishop of Ross, have declared to me that under the hope of her restitution to the crown, and his promise that he will reinstate her, there has been a mutual promise of marriage between them, the which has been frankly committed to me. . . . I have assured them that I will labour to obtain your favour toward them, provided that both of them will be governed by you, the which they have promised, and given me the hand that they will; and that on his part, after the queen his mistress, he will continue wholly the faithful servant of the king and yourself all the days of his life.

The same dispatch requests on behalf of Mary "five or six hundred French harquebuss men, armed and victualled for the time," to be sent to Dumbarton before the end of October; and in the postscript he says, that the Duke of Alba has sent a letter to pay 10,000 crowns to "the said lady, which I think is earnest money for the other party; but I hope to get them into the hands of the Duke of Norfolk as earnest money for his." "The said lady" here must be Elizabeth, and the money was probably in part payment for the English goods seized. But while the queen-mother was aiding Mary and Norfolk, she had another plan in view, the marriage of one of her sons with Elizabeth; and the ambassador thus gives account of his conversation respecting it:—

I told her that it was a most astounding thing that she should do such wrong to all the great gifts

which God had given her, of beauty, of wisdom, of virtue, and high station, not to leave any fair child to succeed her. . . . That there was no prince who would not deem himself very happy if she would choose him. . . . That I did not see that there was any one more desirable for all Christendom, for any princess to marry than the three princes of France, the sons of King Henry, of whom the eldest was a most worthy king, true successor of his father, the second equally royal in every respect except a crown, and the third equal to the two eldest. She replied that the king would not like her, and that he would be ashamed to show at his entrance into Paris a queen as old as she looked, nor was she of an age to leave her country, as the Queen of Scots had done, who was taken when very young to France.

To this De la Mothe replied with compliments on her beauty and arguments of state policy:—

But I know not, said she, if the queen would like it, for possibly she would wish a daughter-in-law so young that she might manage her at her pleasure. "I know," I replied, "that the queen is so mild and of such gentle and gracious manners (!) that both of you could not but be most agreeable to each other, being always together." On this subject M. Cecil questioned me, upon which, as much to show a good feeling toward the queen, his mistress, as not to hint an opinion of any alliance or intelligence with the King of Spain, which might serve him for a pretext to withdraw from us, I mystified him sufficiently as to the proposition relating to the emperor [the negotiation respecting the marriage of Charles with his daughter], and told him that I wished to treat with him respecting another marriage, which would be the most suitable in the world for the establishment of the two kingdoms and for the peace of Christendom. . . . The chief men of this kingdom hold it for certain that the queen will never marry, and that she pretends to the contrary merely to amuse the world and to hinder her subjects from pressing her to declare her successor. . . . The secretary, Cecil, is very much opposed to the Queen of Scots, that he may advance the claim of the heirs of Hertford, who are under his guardianship, and are of the house of Somerset, of which he is a retainer also; so is the keeper of the seals, and the bishops and ministers of the new religion, fearing that if she came to the crown she would exterminate the said religion. Still it will be seen that by the support of the Duke of Norfolk, the Earl of Arundel, the Earl of Leicester, the Earl of Pembroke, and that of Sussex, the chief lords in the north, and others of this kingdom, that the right of the said lady will prevail over every other: respecting which the said Earl of Leicester, in chief favour with the Duke of Norfolk, appears to have undertaken to give good service without offending in anything the Queen of England, preparing by these means a refuge for the time to come against the many enemies and jealousies which he has raised in this kingdom.

Thus Leicester seems to have been trusted not merely by the credulous Norfolk, but by the more acute and wary French ambassador. Meanwhile, although Elizabeth pretended to be willing to receive proposals of marriage with one of the French princes, aid was afforded to the Huguenots. The Queen of Navarre openly pledged her jewels to the London merchants, and Sir Thomas Gresham, "the queen's own factor," as De la Mothe remarks, undertook the negotiation. Gresham also busied himself in purchasing arms and ammunition. In August, Elizabeth first seems to have become acquainted with the intrigues of Norfolk, and to have indirectly cautioned him respecting them during her stay at Farnham. That this was the case is corroborated by the fifty-third dispatch, where De la Mothe, unconscious evidently that Leicester had disclosed the whole plot, mentions that at an interview with Elizabeth at Farnham Castle on the 21st, he took occasion to "supplicate in the name of the said lady, and very pressingly on the part of your Majesty, that she would promptly grant the aid and remedy which she had always promised." At this, he remarks, she showed herself a little moved, and replied at length:—

"Praying me to write to you, that she had not

yet had leisure to look over the declarations which you had sent, but which she hoped would be as I had said. \* \* And she prayed your Majesty to have patience, only for fifteen days, for immediately after, she would proceed in this matter in a way that she hoped could not but be approved by every prince in the world; but she would tell me, that she had endeavoured to be more than a good mother to the Queen of Scots, while she was labouring to raise reasonable practices; and that she who did not act well toward a mother, deserved a step-mother: calling thereupon those of her council, and the Bishop of Ross, to whom she recited in French the greater part of what I had said to her, and also the reply which I had made: then she translated them into English, and in a great rage, with many complaints against the Queen of Scots, dared the ablest and the greatest to prevent the cutting off her head. I tried some time after to soften her, and at least to justify your Majesty and myself in never having intended any sinister practices (!), to which she replied, 'Sir, let her justify you and me also, as to that; she knows well who have been guilty.'"

Subsequently, Elizabeth expressed herself satisfied with the declarations of the French King; but more than a week after the foregoing interview, De la Mothe was still ignorant that Norfolk's plot was discovered. In the fifty-eighth dispatch, dated September 14, he mentions Leicester's illness, and then states that there had been high words between the Queen and the Duke of Norfolk; that "the Duke remains firm to his purpose, and thinks, that if the said Lady does not yield, he will attempt all at once to rescue the Queen of Scotland, and take her to a place of greater security in this kingdom than that where she now is, and to absent himself from the court." The sixtieth relates, that Elizabeth "has conceived a greater jealousy and hostility toward Mary than heretofore, and that, besides doubling her guards, she has determined that the Earl of Huntington and Viscount Hertford, with some one belonging to them, shall be always where the Queen of Scots is;" to which the notice is appended, that Norfolk has quitted the court without leave. A private letter to the Queen-mother, of the 27th of September, states, that the "wrath of the Queen passes all bounds against the said Lady," and that Mary's party are ready to take up arms, if the council, which meet to-morrow at Windsor, afford no remedy. A letter from Mary is appended, in which she complains to the ambassador that she is "about to be placed in the hands of the greatest enemies she has in the world, and prays him to keep securely a packet of letters which she sends with it, either for the Bishop of Ross, or for the Duke of Norfolk, and to join with them and her other friends, to determine what shall be most expedient for her safety."

The time had now come for Cecil and his party to act; and they appear to have acted with extraordinary vigour. From other sources we learn that every link of the plot was fully known to them, and they now determined to strike the blow. The foregoing dispatch, with the letters, were seized, "about three miles from the house of Lord Cobham;" and, guided probably by the contents, the Earls of Arundel and Pembroke, and Lord Lumley, were put under arrest; Labran, one of the ambassador's suite, was also arrested, and his papers searched: the Earl of Shrewsbury was sent to convey the Queen of Scots to Tutbury, the guard at the Tower was doubled, the ports closed, and search made for the Duke of Norfolk.

The sixty-fifth dispatch relates the committal of the Duke to the Tower, and the following gives the news of the arrest of Ridolfi and Throckmorton, with the names of the commissioners appointed to try them.† The sixty-

† It would be a great advantage in future volumes to give a glossary of the English names: the spelling of



seventh relates the first interview of De la Mothe with the Queen after the arrest of Norfolk, when he protests, in the teeth of his own dispatches, that he was ignorant of Norfolk's projects, until Elizabeth mentioned them (!). The seventy-second notifies the order of Elizabeth for the northern lords to appear at Court, and the next gives an account of the rising there. De la Mothe's dispatches do not throw much additional light on this subject. Being so far distant, and forced to depend on various persons for intelligence, he seems to have believed it of far more political importance than it really was; and, ere this insurrection was entirely put down, the second volume closes. Enough, however, appears, to show, that the rising in the north originated with Spain, and was aided by France.

The great historical importance of a work like this, will be appreciated, we think, by our readers, when we remind them that all these details belong to a period of little more than thirteen months; thus forming actually a diary of many of the most important events of a most important reign. The editors remark, that their progress will depend upon the encouragement they receive: of that we should hope there will be no doubt, for a work like this is invaluable to every one who would repair to the fountain-head of history.

*Letters on Paraguay; comprising an Account of a Four Years' Residence in that Republic, under the Government of the Dictator Francia.*  
By J. P. & W. P. Robertson. 2 vols.

[Second Notice.]

The Dictator Francia now appears on the stage—and though the Messrs. Robertson have reserved the history of his government for a third volume, to be hereafter published, it may help the reader to form a correct judgment of this extraordinary man, if we introduce him at once, and in his natural character, as manifested in private life:—

"On one of those lovely evenings in Paraguay, after the south-west wind has both cleared and cooled the air, I was drawn, says Mr. Robertson, in my pursuit of game, into a peaceful valley, remarkable for its combination of all the striking features of the scenery of the country. Suddenly I came upon a neat and unpretending cottage. Up rose a partridge; I fired, and the bird came to the ground. A voice from behind called out, 'Buen tiro!'—'a good shot.' I turned round, and beheld a gentleman of about fifty years of age, dressed in a suit of black, with a large scarlet capote, or cloak, thrown over his shoulders. He had a mâté-cup in one hand, a cigar in the other; and a little urchin of a negro, with his arms crossed, was in attendance by the gentleman's side. The stranger's countenance was dark, and his black eyes were very penetrating, while his jet hair, combed back from a bold forehead, and hanging in natural ringlets over his shoulders, gave him a dignified and striking air. He wore on his shoes large golden buckles, and the knees of his breeches the same. I apologized for having fired so close to his house; but, with great kindness and urbanity, the owner of it assured me there was no occasion for my offering the least excuse; and that his house and grounds were at my service, whenever I chose to amuse myself with my gun in that direction. In exercise of the primitive and simple hospitality common in the country, I was invited to sit down under the corridor, and take a cigar and a mâté. A celestial globe, a large telescope, and a theodolite were under the little portico; and I immediately inferred that the personage before me was no other than Doctor Francia. The apparatus accorded with what I had heard of his reputation for a knowledge of the occult sciences; but I was not long left to conjecture on this point; for he presently informed me, in answer to my appeal whether I had not the honour of addressing Dr. Francia, that he was that person. 'And I presume,' these are so arbitrary, as to be almost unintelligible. Knollys is 'Quenolles,' the Lord Keeper is termed 'Milord Quiper,' Gresham is Grassan, Hawkins is Haquens, Keilworth is Quilligworth, while the Scotch names are even more incomprehensible.

he continued, 'that you are the Cavallero Ingles, who resides at Doña Juana Ysiquel's?' I replied that I was; when he said he had intended to call on me; but that such was the state of politics in Paraguay, and particularly as far as himself was concerned, that he found it necessary to live in great seclusion. He could no otherwise, he added, avoid the having of sinister interpretations put upon his most trifling actions. \* \*

"Not a trace of the sanguinary propensities, or of the ungovernable caprice, by the exercise of which he afterwards attained so bad a celebrity, were recognizable in the manner, or deducible from the conversation, of Francia, at the time of which I am now speaking. Quite the reverse. His demeanour was subdued and unostentatious; his principles, as far as they could be ascertained from his own declarations, just, though not very exalted; and his legal integrity, as an advocate, had never been disputed. *Vanité* seemed to me to be the leading feature of his character; and though there was a latent sternness and almost continual severity in his countenance, yet, when relaxed into a smile, they only made, by contrast, an impression the more winning upon those with whom he conversed. \* \*

"Night drew on apace, and I bade adieu to my loquacious, as well as gracious host. I little fancied, then, either that he was to figure as he has since done, or that an intercourse begun with so much civility, was to end with so much injustice. At this time, Francia, though living in such apparent seclusion, it was afterwards known, had been busy in intrigue against the Government."

Mr. Robertson now visited Buenos Ayres, and on his return he found the star of Francia in the ascendant. Having been recalled to power by the general voice of his countrymen, he immediately assembled a congress, and was elected first consul.

We cannot leave Paraguay without a word or two respecting the Misiones. As to the labours of the Jesuits, the Messrs. Robertson have collected together a good deal of information, but not much that is new, or that could not have been found without great labour on this side the Atlantic. We prefer our author's personal observations, and shall therefore give an account of a visit to Candelaria:—

"Resolved myself to explore the region of Misiones, of which I had heard so much, I borrowed from a Paraguayan gentleman of the old school his crazy lumbering carriage, on which I had first set my eyes at the feast of Ytapúa. The blacksmith and cartwright did their best to make it hold together; but they would never have succeeded, unless the peons had come to their assistance with a wet hide, and bound the carriage with it from head to foot: so that when the hide dried, the vehicle seemed as if in a strait jacket. I was furnished with letters introductory, from the Consul, and from several other friends to every body of any note in the part of the country which it was my intention to visit. Off we started pretty much in the style in which I had left Buenos Ayres; with this difference, however, that three peons drove before us a relay of thirty horses, as there are no post-houses at which to change in the route to Misiones. \* \*

"In a straight line the distance is only fifty-six leagues. Throughout the whole journey, I was treated not only with the utmost hospitality, but with a deference and respect, with which I could have willingly dispensed. The natives, however, of that part of the country, from high to low, had been taught to look up with such awe to any European, travelling in the way in which I did,—especially as it was public functionaries of some note alone who had been in the habit of doing so,—that it would have been no easy task to disturb their associations in my case. I bore my honours as meekly as I could, because I knew I was not entitled to them; and I bore them patiently, because the notion which the people had erroneously formed of my dignity made them exert themselves the more to let me see whatever was to be seen. \* \*

"Sad, cheerless, desolate, was the appearance of both themselves and their towns. Every thing was falling to decay,—the church, the college, the huts.

Many of the latter were in ruins; the men stood listless at their doors; weeds and briars were everywhere springing up; the population was dwindling away daily; and it was with difficulty the two curates in each town could scrape together enough, from the labour of the whole community, scantily to feed, and badly to clothe, the members of it. But I proceed to give you a little more particular description of the town of Candelaria, the seat of the governor-general, and the capital of the Entrerios Misiones. From that you will be enabled to infer what must have been the state of all the rest. It was certainly in no case better; in many instances, it was a great deal worse. Candelaria, under the Jesuits, had three thousand and sixty-four inhabitants; they were now diminished to seven hundred. It had a splendid church richly ornamented, a capacious college, large gardens, and extensive chacaras, or cultivated grounds, around it. The church was now in a state of dilapidation; the rain was pouring in through many apertures of the roof; the walls were bare; and even the altar was uncovered by a cloth. Not having been whitewashed for years, the walls were not only bare, but black. From the damp parts of them, at not very distant intervals there oozed out a green mould, forming a soil, from which depended nettles and other noxious weeds. The college was pretty much in the same state; and what had once been a brick-laid patio, or quadrangle, was so completely covered with grass and weeds, that no trace of the original foundation was discoverable. As for the unweeded garden, 'things rank and gross in nature possessed it merely.' Every fruit-tree had been hewed down for firewood. Of the original huts and cottages, scarcely a third of their number was standing; and of those that did remain, there was no line so little observable as the perpendicular. They were awry, some leaning to one side, some inclining to another; and all indicating a speedy intention of laying their bones and dust in the lap of mother earth, and by the side of the tenements that had already mouldered to decay."

We shall conclude with an account of a journey to the woods of the Paraguay tea-tree—the tea itself forming an extensive branch of the commerce of the country. The strange reports of the manner of preparing it, and of the labours and hardships of those employed to collect it, tempted Mr. Robertson to join one of these exploring parties:—

"I was invited (says Mr. R.) by one of the great master yerba manufacturers to sail with him in his smack to Villa Real, and to accompany him by land from thence to the scene of his operations in the woods. Before I describe this, I will give you some account of the men,—masters and labourers,—by whom the traffic was carried on. It was one of so arduous a nature, that, though very lucrative, it was generally conducted either by young beginners in the world, or by low men, who, like miners, having got entangled in a system of gambling, alternately made and lost fortunes; were always poor; and finally died in the yerbales. Exceptions to this rule there were; but very few. Like their masters, the peons were almost invariably gamblers too. They were, therefore, no sooner out of the woods, than they were obliged to return to them. \* \*

"So impenetrable and overrun with brushwood are these forests in many places, and so tenanted in all by reptiles and insects of the most tormenting and often venomous description, that the only animals capable of being driven through them are bulls, which are necessary for the maintenance of the colony of yerba-makers, and mules, which are not less necessary for the conveyance out of the woods of the tea, after it is manufactured and packed. With Miguel Carbonell, then, (a very coarse Catalán), who had spent a long time alternately on the river and in the woods, I sailed from Assumption still farther up the stream; and we arrived at Villa Real, in lat. 23° 20' south, on the tenth day of our mosquito martyrdom on the Paraguay. We were now on the borders of a territory inhabited by the Mbaya and Guaycurá Indians. The latter is the fiercest of all the unsubdued tribes in that quarter. In two days after our arrival, we left Villa Real; and never was I more thankful than when we did; for if the pains and penalties of purgatory be at all equal to those of that place, there certainly cannot be much to fear beyond it.

The heat, the effluvia, the filth, the mosquitos, the lizards, the serpents, the toads, the centipedes, the bincuchas, the bats, the naked inhabitants, the wretched huts, the squalid poverty,—all rendered my residence there, for two days, not only painful, but loathsome in the highest degree. Our cavalcade, as we departed, was rather a grotesque one. Mounted upon forty mules rode by as many peons, with no covering but a shirt, a pair of drawers, a girdle round their waist, and a red cap on their head. Some of the mules were saddled, some not: before us went a dozen sumpter mules, laden with barrels of spirits, tobacco, and other merchandise. Half-a-dozen of the peons, a little way ahead, drove upwards of a hundred bulls, bellowing under the smart inflicted by stinging insects; while the Catalán, a capataz, or overseer, and myself brought up the rear. Our legs were cased in raw hide, to defend us at once from the thorns of the underwood and from the bites of the mosquitos. Our faces, with the same object, were vizzed in tanned sheepskin, and our hands were fitted with gloves of the same material. The peons, it appeared to me, had their own hides so tanned and hardened, as to require no better protection from the insects.

On the 5th day a shout proclaimed that the party had come upon a yerbal, or forest of the yerba tree, and active preparations were immediately made for a six months' settlement:—

"At dawn of day the peons were at work. Here one little band was constructing for our habitation a long line of wigwams, and overlaying them with the broad leaves of the palm-tree and of the banana. There, other sets were making preparations for the manufacturing and storing of the yerba. These preparations consisted, first, in the construction of the *tatacia*. This was a small space of ground, about six feet square, of which the soil was beaten down with heavy mallets, till it became a hard and consistent foundation. At the four corners of this space, and at right angles, were driven in four very strong stakes, while upon the surface of it were laid large logs of wood. This was the place at which the leaves and small sprigs of the yerba tree, when brought from the woods, were first scorched, fire being set to the logs of wood within it. By the side of the *tatacia* was spread an ample square of hide-work, of which, after the scorched leaves were laid upon it, a peon gathered up the four corners, and proceeded with his burthen on his shoulder to the second place constructed, viz. the *barbacia*. This was an arch of considerable span, and of which the support consisted of three strong trestles. The centro trestle formed the highest part of the arch. Over this superstructure were laid cross bars strongly nailed to stakes on either side of the central supports, and so formed the roof of the arch. The leaves being separated, after the *tatacia* process, from the grosser boughs of the yerba-tree, were laid on this roof, under which a large fire was kindled. Of this fire the flames ascended and still farther scorched the leaves of the yerba. The two peons beneath the arch with long poles, took care, as far as they could, that no ignition should take place; and, in order to extinguish this when it did occur, another peon was stationed at the top of the arch. Along both sides of this there were two deal planks; and, with a long stick in his hand, the peon ran along these planks, and instantly extinguished any incipient sparks of fire that appeared. When the yerba was thoroughly scorched, the fire was swept from under the *barbacia*, or arch; the ground was then swept, and pounded with heavy mallets, into the hardest and smoothest substance. The scorched leaves and very small twigs were then thrown down from the roof of the arch, and by means of a rude wooden mill, ground to powder. The yerba, or tea, was now ready for use; and being conveyed to a large shed, previously erected for the purpose, was there received, weighed, and stored by the overseer. The peons worked in couples, except that they hired a third peon, and paid him accordingly, to aid them in superintending the operations of the *barbacia*. These two peons got a receipt for every portion of tea which they delivered to the overseer; and they were paid for it at the end of their stipulated sojourn in the woods, at the rate of two rials, or a shilling, for the arbores of twenty-five pounds. The next and last process, and the most laborious of all, was that of packing the tea. This was done by first sewing to-

gether, in a square form, the half of a bull's hide, which being still damp, was fastened by two of its corners to two strong trestles driven far into the ground. The packer, then, with an enormous stick made of the heaviest wood, and having a huge block at one end, and a pyramidal piece to give it a greater impulse, at the other, pressed, by repeated effort, the yerba into the hide sack, till he got it full to the brim. It then contained from two hundred to two hundred and twenty pounds, and being sewed up, and left to tighten over the contents as the hide dried, it formed, at the end of a couple of days, by exposure to the sun, a substance as hard as stone, and almost as weighty and impervious too. \* \*

"After all the preparations which I have detailed were completed (and it required only three days to finish them), the peons sallied forth from the yerba colony by couples. I accompanied two of the stoutest and best of them. They had with them no other weapon than a small axe; no other clothing than a girdle round their waist, and a red cap on their head; no other provision than a cigar, and a cow's horn filled with water; and they were animated by no other hope or desire, that I could perceive, than those of soon discovering a part of the wood thickly studded with the yerba-tree. They also desired to find it as near as possible to the colonial encampment, in order that the labour of carrying the rough branches to the scene of operations might be as much as possible diminished. We had scarcely skirted for a quarter of a mile the woods which shut in the valley where we were bivouacked, when we came upon numerous clumps of the yerba-tree. It was of all sizes, from that of the shrub to that of the full grown orange-tree; the leaves of it were very like those of that beautiful production. The smaller the plant, the better is the tea which is taken from it considered to be. To work with their hatchets went the peons; and in less than a couple of hours they had gathered a mountain of branches, and piled them up in the form of a haystack. Both of them then filled their large ponchos with the coveted article of commerce in its raw state; and they marched off with their respective loads. \* \*

"When I returned to the colony, I found the peons coming by two and two, from every part of the valley, all laden in the same way. There were twenty *tatacias*, twenty *barbacias*, and twenty piles of the yerba cut and ready for manufacture. Two days after that, the whole colony was in a blaze. *Tatacias* and *barbacias* were enveloped in smoke; on the third day, all was stowed away in the shed; and on the fourth, the peons again went out to procure more of the boughs and leaves. During the eight days that I witnessed these operations, I was profoundly struck with the patient and laborious perseverance of the workmen. Then, for their abstemiousness, it was, if possible, still more striking. Beef dried in the sun, and a few water-melons, constituted their whole fare, with, at the close of day, a cigar and a glass of spirits. Neither the perpendicular rays of the sun, nor the everlasting attacks of insects and reptiles, had the power of producing an intermission of labour, or of damping merriment after the toils of the day were brought to a close."

Here we must conclude.

**List of New Books.**—Reid (Lieut.-Col.) on the Law of Storms, royal 8vo. 21s. cl.—The Hand-Book for Switzerland, Savoy, &c. post 8vo. 10s. cl.—Lloyd's Letters from the West Indies, 12mo. 6s. cl.—Structures on some Parts of the Oxford Tracts, a Charge, by the Rev. J. H. Brown, 8vo. 6s. cl.—Close's Typographical Sermons, 12mo. 5s. cl.—Hannay's Concordance, 18mo. 6s. cl.—A Pleasure Tour to Ireland, 18mo. 2s. 6d. cl.—Hieroglyphics on the Coffin of Mycerinus, folio, 13s. swd.—An Essay on Food, by W. Griesenthwaite, 4s. cl.—Cognitions of a Vagabond, by the Author of 'Frank Orby,' post 8vo. 8s. bds.—Graham on Indigestion, 4th edit. with additions, 8vo. 8s. 6d. bds.—Edinburgh Academy Rudiments of the Latin, 5th edit. 12mo. 2s. bd.—Noelken's German Grammar, 8th edit. 12mo. 8s. bds.—Celestial Science, by Dr. Dick, 2nd edit. 12mo. 10s. 6d. cl.—Hack's Winter Evenings, 12mo. new edit. 6s. cl.—Upcher's Stories from the Commandments, 16mo. 2s. 6d. cl.—Russell on Development in Infant Schools, 2nd edit. 12mo. 2s. 6d. cl.—Archbold's Act for Abolition of Imprisonment for Debt, 12mo. 5s. bds.—Mogg's Map of the London and Birmingham Railway, 1s. 6d. case.—Wickens on the Laws of Debit and Creditor, 12mo. 1s. 6d. swd.—A Guide through Ireland, by J. Fraser, 12mo. 12s. cl.—Sullivan's Orthographical Exercises, 18mo. 2nd edit. 1s. 6d. cl.—Carey on the Evidences and Corruptions of Christianity, 8vo. 8s. bds.—The Mother's Book, by Mrs. Child, new edit. royal 32mo. 2s. cl.—The Frugal Housewife, by Mrs. Child, new edit. royal 32mo. 2s. cl.—Gambert's Manual of French Pronunciation, 12mo. 2s. bd.

# EIGHTH MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

[From our own Correspondents.]

## SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.—Friday.

Sir T. M. Brisbane reported the result of an experiment to determine the difference of longitude between London and Edinburgh. Having observed, he said, the surprising accuracy with which the difference of longitudes of London and Paris had been obtained by Mr. Dent's chronometers, he applied to that gentleman, and, with a liberality which did him the highest credit, he placed at Sir Thomas Brisbane's disposal twelve of his valuable chronometers. With these, the differences of longitude of London, Edinburgh, and Makerstoun were taken; and by a mean of all the observations taken in going to the latter station and in returning, they were found to differ only by five one-hundredths of a second. He exhibited to the Section the following table.

Chronometers.	Difference of Longitudes.			
	Going.	Returning.	Mean of Going and Returning.	
A	m. s. 2 40.14	m. s. 2 39.10	m. s. 2 39.62	—0.16 Minim. difference.
B	.. 39.68	.. 39.60	.. 39.67	
C	.. 39.85	.. 39.52	.. 39.68	
D	.. 39.68	.. 39.96	.. 39.82	
E	.. 39.06	.. 39.89	.. 39.78	+0.34 Maxim. difference.
F	.. 40.33	.. 39.92	.. 40.12	
G	.. 39.48	.. 39.95	.. 39.72	
H	.. 39.79	.. 40.13	.. 39.96	
I	.. 39.99	.. 39.59	.. 39.79	
K	.. 40.03	.. 39.68	.. 39.86	
L	.. 39.76	.. 39.73	.. 39.74	
M	.. 39.52	.. 39.75	.. 39.64	
Means	2 39.83	2 39.74	2 39.78	

Sir John Herschel said, it was a subject of the utmost surprise to him to find the mean of all the observations of these twelve chronometers did not, under the circumstances, differ by more than five hundredths of a second. Kessels, of Altona, had tried this method, by taking his chronometers to Berlin and back again (as he believed), and the entire error was considerably within one tenth of a second, and, when the paved and almost impassable roads of the continent were taken into account, this was an astonishing degree of accuracy. Sir John said, that in a notice lately given by Mr. Dent, of a determination by himself and Major Sabine, of the difference of longitude of London and Paris, a statement was given of the error of the observations which was not quite fair; the truth was, Mr. Pond's assistant, in giving them the Greenwich time, had been inadvertently one second wrong; this error of course appeared in their result, but it was afterwards detected by the assistant himself and corrected. This very fact, however, must be very striking to the public, when an error of one single second was so readily detected, and became such a matter of debate among philosophers.

Mr. Whewell laid before the Section Mr. Bunt's account of the details of the levelling operations between the Bristol and English Channels, of which the Report had already been read before the Section. Mr. Whewell stated that he had himself accompanied Mr. Bunt on his survey so far as to acquaint himself with the process, and had seen that the coincidence of the independent readings of Mr. Bunt and his assistant was as close as stated, namely, within two or three 10,000th parts of a foot. [We gave the more interesting parts of Mr. Bunt's letter, in a note on Mr. Whewell's former paper, so that we might bring the whole subject at once before the reader—see ante, p. 619.]—Mr. Whewell stated that he had also received a letter from Mr. Bunt, in which that gentleman reported that he had discovered, by discussion of the Bristol tide observations, a small difference between the superior and inferior tides. Such a difference arises theoretically from the different distances of the moon from the surface of the earth immediately under her, and from the opposite surface. It appears in this manner that the heights of the tides should be as  $\frac{1}{2}r^2 - \frac{1}{2}r^2 \cos^2 \theta$  and  $\frac{1}{2}r^2 + \frac{1}{2}r^2 \cos^2 \theta$ , or about as 41 to 39. The result of Mr. Bunt's discussions agrees very nearly with this, both in the heights and lines.



Mr. Whewell then read a letter from the Astronomer Royal, G. B. Airy, Esq. 'On the means adopted for correcting the local Magnetic Action of the Compass in Iron Steam Ships.'

'Royal Observatory, Greenwich, Aug. 21, 1838.  
'Dear Whewell,—Among the causes which have prevented me from attending the meeting of the British Association, the principal is, the trouble of carrying on a series of observations and experiments (at the request of the Admiralty) for correcting the local magnetic action on the compass, in the iron steam ship the *Rainbow*. Perhaps by communicating the principal results to the proper Section of the Association, you will more than compensate for my absence. The compass was placed in four different stations near the deck; and in four stations about 13 feet above the deck; and for each of these the ship was turned round, and the disturbance observed in many positions. The disturbances even at the upper stations were great, but at all the lower stations they were very great, and at the station next the stern they were enormous. The whole amount there was  $100^\circ$  (from  $-50^\circ$  to  $+50^\circ$ ); and on one occasion, in turning the vessel about  $24^\circ$ , the needle moved  $74^\circ$  in the opposite direction. I should have perhaps found some difficulty in reducing these to laws if I had not made some observations of the horizontal intensity at the four lower stations, in different positions of the ship. From these I was able to infer the separate amounts of disturbance due to the permanent magnetism of the ship, and to the induced magnetism, and to construct correctors. These correctors I tried yesterday, completely at the sternmost station, and imperfectly at two others. The correction at the sternmost station was (speaking generally) complete; the extreme of deviation, which formerly exceeded  $100^\circ$ , did not, with the corrector, exceed  $1^\circ$ . At the other stations I had not leisure to adjust the apparatus: but I fully expect to-morrow to produce the same accordance at them. This result is, I should think, important in a practical sense. Some theoretical results, which I did not anticipate, are also obtained. At the stern position, the disturbance is produced almost entirely by the permanent magnetism, the inductive magnetism producing only  $\frac{1}{3}$  of the whole effect. Going towards the head, the effect of the permanent magnetism diminishes, and that of the inductive magnetism increases, till the latter produces about  $\frac{1}{2}$  of the whole effect. The resolved part of the permanent magnetism transverse to the ship, varies little (increasing somewhat towards the head); the part longitudinal to the ship decreases rapidly from the stern to the head (where it is less than the transverse part). I must not omit to mention that Mr. Baily took one department of the observations for one day, and will therefore be able to give you a complete account of the method of conducting the compass observations. In this, however, there is nothing very important: the principal object being to contrive methods of observing, in a place where no distant object could be seen, and where there seemed to be, at first, great reason for suspecting considerable local attraction peculiar to the place, and independent of the ship.

"G. B. AIRY."

Mr. Baily described the method of observing the deviation of the needle, caused by the immense mass of iron in this vessel, the *Rainbow*, by theodolites fixed in proper positions on the shore; the deviation of the needle, as the ship's head was veered round, was ascertained, when the needle on board was placed in different parts of the vessel.—Sir John Herschel said, that Barlow's compensating plate having been found inapplicable to the correction of the effect of such large masses of iron, it became a problem of much interest to find out an adequate correction, when the following principle was suggested by the Astronomer Royal: After the effect of the vessel upon the compass while on board had been determined, as described by Mr. Baily, the compass was removed to the shore, and placed in the neighbourhood of a large mass of iron, in such a way that the effect of this mass was the same as that of the vessel, a compensation for this was then applied to the compass; and, upon removing the entire apparatus on board, it is obvious the ship, which is an exact equivalent for the mass of iron (now left on shore) must be exactly compensated also. A ludicrous circumstance had occurred, proving the neces-

sity of this compensation. When they were bringing the vessel round from Glasgow, where she had been built, they had hazy weather, and at the Land's End they were under the necessity of hailing a vessel to know where they were. The crew of the other vessel were in amazement to conceive why a ship of such magnitude had been intrusted to such a set of land-lubbers.—Capt. Johnson, R.N. said, that Barlow's compensating plate was fully adequate to the compensation of such a mass of iron as that in the *Rainbow*, as he had frequent opportunity of proving; in fact, the maximum deviation of the needle would not be more than  $13^\circ$  when the compass was suspended 18 feet (we believe) from the deck.—Sir John Herschel begged not to be misunderstood: he had no intention to undervalue or disparage the compensating plate of Barlow, which was unquestionably a most valuable discovery.

Professor Lloyd now read a paper, entitled, 'Recalculation of the Observations of the Magnetic Dip and Intensity in Ireland, with Additional Elements.'

Since the publication of the observations on the direction and intensity of the terrestrial magnetic force in Ireland, in the fifth Report of the Association, many additional data have been obtained, which appear to require a new and more complete discussion. The present communication, therefore, may be regarded as a supplement to the former; and its results have removed (at least to the extent that could be reasonably looked for) some discrepancies under which the former laboured. The additional data, which form the groundwork of the present recalculation are, chiefly, the following:—1. Additional observations of the dip and force at the central stations; 2. More exact values of the latitudes and longitudes of the several stations at which observations have been made; 3. Nearer approximation to the amount of the annual change of dip; 4. Re-determination of the corrections to be applied to some of the dipping needles; 5. Determination of the weights of the several results, deduced on more exact principles. A very considerable series of dip observations having been made by Mr. Lloyd, in Dublin, it occurred to him that they might furnish a tolerable approximation to the amount of the annual decrease of dip, notwithstanding the limited space of time (three years) over which the observations are spread. Let  $u$  denote the probable dip at a given epoch (the 1st January, 1836);  $a$  the observed dip at any other time;  $n$  the number of effective months in the interval; and  $\Delta u$  the monthly decrease, which is assumed (in accordance with the observations of M. Kupffer) to take place during the eight months from May to December inclusive. Assuming then (as we are unacquainted with the law of monthly change) that the decrease takes place uniformly throughout these eight months, it is manifest that each of the results will furnish an equation of condition of the form—

$$u + n \Delta u = a;$$

and if we combine these equations by the method of least squares, we obtain the most probable values of  $u$  and  $\Delta u$ —i.e., the most probable values of the dip at a given epoch, and of its monthly change. In this manner it is found that the annual decrease of dip in Dublin is  $2''.38$ . The recent and more complete observations of Major Sabine, in London, make the amount of the annual decrease  $2''.40$ ; and the close agreement of the results must be regarded as affording a strong mutual confirmation. The next subject connected with these observations, which Mr. Lloyd desired to bring under the notice of the Section, is the correction to be applied to the results of the several dipping needles. The errors of dipping needles may be ascribed to one or other of the three following sources:—1. The friction of the axle on its supports; 2. The imperfect curvature of the axle itself; 3. The magnetism of the limb. The errors arising from the first-mentioned cause, are, however, very different in their nature from those due to the two latter. The positive and negative errors, due to friction, are equally probable; and the effect of the disturbing cause is merely to widen the limits of probable error. The imperfect curvature of the axle, and the magnetism of the limb, however, act very differently. It will be easily understood that either of these sources of error must, within a moderate range of dip, affect all the results in the same manner; so that they will all require a correction having the same sign; and when the range of

dip is very small, the amount of the disturbance will be nearly the same in all, and the correction required will be nearly constant. A remarkable instance of one of these disturbing influences occurred in the present series of observations. Having purposely destroyed the balance in two of his dipping needles, Mr. Lloyd proceeded to use them exclusively in observations of intensity, according to a method, the principles of which have already been laid before the Association. The results thus obtained, were, however, so anomalous, that he was compelled to lay them aside altogether. After some tedious and vain attempts to discover the source of the anomaly, Mr. Lloyd was at length satisfied that the needles were under the influence of some other force, besides the earth's magnetism and gravity; and he concluded that this disturbing force could be no other than magnetism in the dip-circle itself. Trial soon verified this conjecture; and he had the mortification to find that the apparatus which he had been long using was throughout magnetic; and that the magnetism was greatest in the graduated limb, the very part in which, from its proximity to the needle, it would operate most powerfully. He had next to consider the painful question,—How far the numerous results obtained with this instrument were vitiated by this newly-discovered source of error? Whether they were entitled to any confidence; and if so, what were the probable limits of error. It is manifest that if the ferruginous matter were uniformly distributed throughout the limb, it could produce no disturbance in the position of a needle, which (like the dipping needle) divides the limb symmetrically. It is only by irregularity in its distribution, that the magnetic matter of the limb can operate as a disturbing cause; and then it is manifestly only by the difference of the attractions on the two sides of each pole that the needle is actually disturbed. Hence, though the magnetism of the limb may exert a very sensible action upon a test needle, in a position at right angles to its plane, the effect upon a dipping needle may be comparatively trifling. Mr. Lloyd next proceeded to institute a series of experiments for the purpose of estimating these effects. Their result showed that the anomalies observed were produced by two centres of ferruginous matter in the neighbourhood of the zero points of the limb; but they likewise showed that, in the usual positions of the needle, the disturbance, though sensible, did not vary rapidly in amount; so that, for moderate changes of angle, the direction of the needle might be considered to be altered by a constant quantity. Thus, in the neighbourhood of three of the divisions of  $70^\circ$ , the needle was sensibly deflected, and in such a manner as to diminish the apparent dip; but the deflection did not vary rapidly with the angle; so that, for small changes of dip, the error might be regarded as nearly constant. Defective, therefore, as the apparatus was in this respect, Mr. Lloyd was satisfied that the differences of dip obtained with it in Ireland might be relied on within the usual limits of error in good instruments; and that, to obtain the absolute dip from the observed results, it was only necessary to apply a positive correction, which may be regarded as constant throughout the series. This correction has been re-examined, by comparing the results of this instrument in Dublin with those of an excellent needle made by Gambley, and observed by the method of arbitrary azimuths, so as to eliminate the errors both of axle and limb. The resulting value of the correction is almost identical with that formerly obtained. In combining the results of observation by the method of least squares, so as to deduce the mean position of the isoclinical and isodynamic lines, it becomes necessary to know the relative value, or weight, of each determination. The principles on which these were assigned in the former memoir were, in some degree, arbitrary and inexact; and tended consequently to distort the final results. In the present investigation, use has been made of a beautiful theorem of the calculus of probabilities, demonstrated by M. Poisson. This theorem furnishes the relation between the probable error of the quantity finally sought, and those of the quantities actually observed, the former being supposed to be a linear function of the latter; and from the known relation between the probable error and the weight, it admits of easy application to a large class of problems, which are of frequent occurrence in investigations like the present.

Major Sabine then explained to the Section that the report on the Magnetic Survey of the British Islands, in regard to the lines of dip and intensity, might be considered as ready for insertion in the forthcoming volume of the Transactions of the Association. Major Sabine entered into some particulars regarding the course of these lines, but it would be impossible to enter into this Report with any effect at present. The Report itself is ordered for publication.

Sir David Brewster said, that in looking over Major Sabine's lately published Report, he could not help again observing that the curves of equal intensity had a very strong resemblance to the optical curves, produced in biaxial crystals, called lemniscates.—Mr. Whewell did not think there could with any propriety be conceived a similarity between those curves whose branches were so dissimilar, and the lemniscates, the very property of which showed that the curves must lie symmetrically about the poles or face.

Major Sabine then addressed the President, and said,—I beg to occupy a few moments of the time of the Section in reference to the report on the Variations of the Magnetic Intensity, which the British Association have done me the honour to print in their last volume. I wish to communicate the results of the observations made by Capt. Duperrey in his voyage of circumnavigation in the *Coquille*, in 1822—1825, which I have only received in the present week in a private communication from that distinguished officer and magnetic observer. The Section will learn with pleasure the satisfactory accord of these observations with those of Captains De Freycinet and Fitz Roy, published in my report. When in compliance with the wishes of the Association, I first entertained the purpose of collecting in one body the observations of intensity made by different observers in all parts of the globe, so far as they are comparable with each other, one of my first steps was to write to Capt. Duperrey to solicit the communication of any intensity results which he might have obtained. I find, by the letter which I have just received, that Capt. Duperrey did kindly comply with my request; but, unfortunately, the packet which must have contained the particulars of his observations has never reached me. The letter which I have just received contains a notice, both of the results he obtained, and of the mode in which they were observed. Had I possessed this information at the time my report was printed, I should on every account have rejoiced to have embodied it in the report; and I am anxious to avail myself of this opportunity of doing what may yet be done to supply the omission. Capt. Duperrey's observations were made with a horizontal needle, which, from accidental circumstances, was not observed with, prior to his departure from France. The usual test of the permanency of the magnetism of the needle, viz. its vibration at the same station at the commencement and at the close of the series, was, therefore omitted in this case. In the absence of this, which is the most conclusive test, Capt. Duperrey has estimated the loss which his needle may have sustained, by comparing its rate of vibration at Paris on his return, with its rate at a station in Peru, in the line of no dip, in which comparison he has assumed the relation of the force at that station to the force at Paris to be as 1. to 1.3482. The loss of magnetism sustained by the needle on this estimation was altogether inconsiderable. The times of vibration at four other stations at which this needle was employed, corrected for temperature and arc, are as follows:—

Payta .....	5° 0'	278.50E	1.024
Offak .....	0 2	130.44	1.079
Port Jackson ..	33 52	151.12	1.617
Ile de France ..	29 9	57.31	1.181

These determinations are inserted in a map engraved in 1832, referred to in a paper read by M. Duperrey to the Academy of Sciences, at Paris, in 1833, entitled, 'Considérations sur le Magnétisme Terrestre.' Capt. Duperrey notices, that at two other stations, viz. Talcahuano and St. Catherine's, he observed the times of vibration of a dipping needle, the poles of which were reversed at each station, in the usual manner, for the observation of the dip; and that the results derived from the vibration of this needle, presuming it to have received, on every occasion when the poles were changed, an equal magnetic charge, correspond in a remarkable manner—as indeed they do, with the subsequent observations of Captains

King and Lutke; but Capt. Duperrey, of course, attaches to these determinations no independent value, and therefore I need not notice them further. Capt. Duperrey has also communicated to me three results obtained at stations in France in 1834, with one of M. Hansteen's needles, made, as it appears, with very great care, and with every necessary precaution. These results are, for

	Lat.	Long.	W. Paris.
Brest .....	48.24	6.50	1.365
Landevence ..	49.18	6.35	1.363
Orléans .....	47.54	0.20	1.341

Major Sabine next adverted to the observations of Prof. Bache and other gentlemen of the United States, which were not included in his report. These observations were made at New York, and in the adjoining states; and Mr. Bache is now engaged in connecting them with Europe, and, consequently, with the general body of the intensity observations. Until this comparison is complete, which it will not be until Mr. Bache returns to the United States, the observations referred to seem to determine the value of the magnetic force at the stations at which they are made, *relatively to each other*, but not *relatively to other parts of the globe*. It was for this reason that they were not available for Major Sabine's report, which had for its object the general distribution of the magnetic force over the earth's surface. The American observations were made with magnetic needles inclosed in a vacuum apparatus, which Mr. Bache had devised, with the view of avoiding some of the anomalies occasionally experienced by other observers. They were made with extreme care, and were remarkable for minute attention to all those circumstances which conduce to the accuracy of the results.

Professor Bache returned thanks to Major Sabine for the very handsome way in which he had come forward, on this public occasion, to notice the magnetic observations made by himself and his friend, Prof. Courtenay. He had conceived that those observations rested under an unfavourable imputation, from their omission in the report of Major Sabine, and he was very much relieved by finding that he had been mistaken. There was one remark in the report of Major Sabine, on which Prof. Bache thought that his observations had thrown some light; and as this was connected with his peculiar method of observing in rarefied air, it might be interesting to the Section to hear a statement of it. In giving the results of M. Lenz, Major Sabine states that for one of the needles employed by M. Lenz, the correction for temperature had been negative, or, in other words, the magnetism of the needle had appeared to be more intense at the higher temperatures, contrary to the usual known law. Major Sabine further stated, that a similar case had occurred in the observations of M. Kupffer, and in his own. Prof. Bache had observed a similar anomaly in regard to one of the needles which he had used. But on applying the negative correction to his observations, it increased the differences between the sets. He had ultimately traced the apparent anomaly to the effect of currents of air formed within the apparatus in which the needle was vibrated. It was obvious (Prof. Bache remarked) that it was exceedingly difficult, in the experiments for obtaining the correction for temperature of the needle, to heat the whole apparatus uniformly; and, in fact, that by the manner of conducting the experiment, the condition of equable heating could only occasionally be fulfilled. If it were not fulfilled, it was also obvious that currents of air would be produced within the apparatus, which might interfere with the time and duration of the oscillations of the needle. By placing the same needle in his apparatus for oscillating in rarefied air, Prof. Bache had found that this anomaly disappeared. This was one of the reasons, stated in his paper, for preferring the method of oscillating in rarefied air.—Sir John Herschel eulogized the report of Major Sabine in the strongest terms. He would not pretend to anticipate the importance of the results, but he saw an epoch rapidly approaching when this science would take its place among the strictest of the mathematical sciences; and he could not but believe, that the day was near when, perhaps, it would rank second only to astronomy, and when its details would be as well understood as the doctrine of the pendulum, and its dynamics studied as those of any other branch of physics. Some of the late

determinations of Gauss were truly sublime. He has just ascertained that the variation is subject to small oscillations, which take place simultaneously everywhere over the whole of Europe, and probably over the earth, so that the cause of this appears to be communicated in an instant from the east to the west.

Sir David Brewster then read a paper, 'On an Ocular Parallax in Vision, and on the Law of Visible Direction.'

The subject of the law of visible direction, said Sir D. Brewster, has been recently made a topic of public discussion; and as the credit, or rather discredit, of this law has, without any reason, been thrown upon me, I felt myself called upon to examine the subject. The honour of suggesting or illustrating this law belongs to Dechales, Porterfield, and Reid. D'Alembert, in his 'Doutes sur différentes questions d'Optique,' maintains that the action of light upon the retina is conformable to the laws of mechanics; and he adds, that it is difficult to conceive how the object could be seen in any other direction than that of a line perpendicular to the curvature of the retina, at the point where it is really excited. He then proceeds to investigate mathematically how the apparent magnitudes of objects would be affected, on the two suppositions, that the line of visible direction coincided with the refracted ray, or with a line perpendicular to the retina, at the point where the refracted ray fell upon it. On the first supposition, he finds that the apparent magnitude of small objects would be increased about 1-13th or 1-16th, if the anterior surface of the crystalline is supposed to have a radius of six lines in place of four. On the second supposition,—namely, that of Porterfield and Reid, he finds that the apparent magnitude of objects would be increased nearly one-third, which, as he remarks, being contrary to experience, we cannot suppose that vision is thus performed, however natural the supposition may appear. "According to what line then," he continues, "do we perceive objects or visible points, which are not placed in the optic axis? This is a point which it appears very difficult to determine exactly and rigorously. However, as experience proves that objects of small extent, which are within the range of our eyes, do not appear sensibly greater than they are in reality, it follows that the visible point, which sends a ray to the corner, is seen sensibly in its place, and, consequently, this visible point is seen sensibly in the direction of a line joining the point itself and its image on the retina. But why is this the case? It is a fact which I will not undertake to explain." This abandonment of the inquiry will appear the more remarkable, when we consider the assumptions from which D'Alembert has deduced the preceding results. He takes for granted the dimensions of the eye as given by Petit and Jurin; and he assumes Jurin's Index of Refraction for the human crystalline lens, though it is almost exactly the same as that of an ox as given by Hawksbee. These, indeed, were the best data he could procure; but he should have inquired if the most probable law of visible direction was compatible with any other dimensions of the eye, and any other refractive powers of the humours, which were within the limits of probability; and, above all, he ought to have examined experimentally the truth of his fundamental assumption, that visible points are really seen in their true places when they are not in the axis of vision. In submitting this assumption to experiment, I had no difficulty in ascertaining that there exists an ocular parallax, and that this parallax is the measure of the deviation of the visible from the real direction of objects. It is nothing in the axis of the eye, and increases as the visible point is more and more distant from that axis; and hence it follows, that during the motion of the eye, when the head is immovable, visible objects do not appear absolutely fixed, and have an apparent magnitude greater than their real magnitude. We are, consequently, not entitled to reject any law of visible direction, on the ground of its giving a position to visible points, and a magnitude to visible objects, different from their position and magnitude. Having removed this difficulty, I proceeded to examine the other data upon which D'Alembert reasoned. According to the anatomy of the eye, which he adopted, the centre of curvature of

\* Opusculum Mathématique, tom. 1, p. 266, 268.

† Ibid. p. 277.



the retina, which he supposes to be spherical, (as he does the eye-ball,) is equidistant from the extremity of the axis, or the *foramen ovale*, and the centre of the crystalline lens. This, however, is far from being the case. M. Dutour, M. Maurice, a recent and able writer on vision, and which is of more consequence, Dr. Thomas Young, have all made the centre of curvature of the retina, at the bottom of the eye, coincident with the centre of the spherical surface of the cornea; and this centre, in place of being almost half way between the apex of the posterior surface of the lens and the *foramen ovale*, is actually almost in contact with that apex. The dissections of Dr. Knox, and of Mr. Clay Wallace, of New York, give results conformable with those of Dr. Young; and almost all these authors regard the human eye as a spheroid. When we add to these considerations, the fact that the refractive power of the crystalline lens assumed by D'Alembert, is nearly triple of what it really is, we have no scruple in concluding that the results of his calculations are inadmissible. Assuming, then, the most correct anatomy of the eye,—namely, that according to which the cornea and the bottom of the retina have the same centre of curvature, it is very clear that if there was no crystalline lens, pencils incident perpendicularly upon the cornea will pass through this common centre, and fall perpendicularly upon the retina. Hence, in this case, the line of visible direction will coincide with the line of real direction, and also with the incident and refracted ray, and will likewise pass through the centre of curvature of the retina. Now, the refractions at the surfaces of the crystalline are exceedingly small, and at moderate inclinations to the axis the deviations from the preceding law are very minute. At an inclination of  $30^\circ$ , a line perpendicular to the point of impression on the retina passes through the common centre already referred to, and does not deviate from the line of real visible direction more than half a degree, a quantity too small to interfere with the purposes of vision. At greater inclinations to the axis of the eye, the deviation of course increases; but as there is no such thing as distinct vision out of the axis, and as the indistinctness increases with the inclination of the incident ray, it is impossible to ascertain by ordinary observation that such a deviation exists. Hence, the mechanical principle of D'Alembert, and the law of Dr. Reid, are substantially true. If the retina is spheroidal, the centre of visible direction will shift its place along the axis of vision, and will correspond to the points where lines perpendicular to the surface of the spheroid cut its lesser axis. As the Almighty has not made the eye achromatic, because it was unnecessary, so he has, in the same economy of his power, not given it the property of seeing visible points in their real directions.

Mr. Whewell said, he considered Reid's law to be strictly correct, and to explain the very complex phenomena. With respect to the very beautiful experiments of Mr. Wheatstone, he thought it impossible that both images should exactly coincide, for the shape of each is quite different from that of the other. In his opinion, there was an accommodation of the eye by an effort of the will.—Sir D. Brewster said, that it was essential to the success of Mr. Wheatstone's experiment, that the two images presented, one to each eye, should be entirely different. That medical persons, in their description of the anatomy of the eye, used language which tended to perpetuate error on the subject, by speaking, for instance, of corresponding points of the retina of each eye, of seeing objects erect by inverted images, by a habit gained, and other similar modes of speaking; whereas he felt sure Mr. Wheatstone's principle was fully adequate to explain every circumstance connected with seeing, as soon as the law of monocular vision was admitted.

Sir David Brewster then communicated to the Section 'An Account of certain New Phenomena of Diffraction.'

The phenomena of the inflexion or the diffraction of light observed by Sir Isaac Newton, Fresnel, and others, were those which are visible at a greater or less distance behind the diffracting body, and according to the undulatory theory, they are produced by the secondary waves which fall converging on the points where the fringes appear within and without the geometrical shadow. These fringes are all calculable by a formula given by Fresnel, depending on

the relation of the two quantities  $a$  and  $b$ ,  $a$  being the distance of the place where the fringes are forced from the diffracting body, and  $b$  the distance of the diffracting body from the point from which the beam of light diverges. In the phenomena hitherto studied, the quantity  $a$  is always positive. The new phenomena discovered and described by Sir David Brewster are those in which  $a$  is negative; and they may be represented by a formula differing from Fresnel's only in the sign of  $a$ . These new phenomena are rendered visible by bringing lenses of different foci in contact with the diffracting body, and the fringes seen in any case are those belonging to a value of  $-a$  equal to the focal distance of the lens. The fringes are in this case produced by the secondary waves, which proceed diverging from the main wave, from a point between the diffracting body and the luminous centre, whose distance from the former is  $a$ . When  $-a$  is equal to  $b$ , the fringes are formed in parallel rays; and when the diffracting body is placed between the lens of the eye, they are formed in converging rays. Hence, in studying these phenomena, we may use a telescope with a micrometer, and obtain the most accurate measures of all the phenomena. These phenomena were illustrated by diagrams.

Sir David Brewster next communicated to the Section 'An Account of an Analogous Series of New Phenomena of Diffraction when produced by a Transparent Diffracting Body.'

These phenomena, when carefully produced by the various methods which he explained, exhibited a series of splendidly coloured bands of light, sometimes perfectly symmetrical and sometimes unsymmetrical, accordingly as the diffracting body was regular or irregular in its section; and the author remarked, that an instrument could thus be constructed for giving new patterns of ribands of all forms and colours. The theory of the phenomena he considered quite simple and obvious, but he stated that a comparison of the results of theory and experiment would be difficult, from the difficulty of ascertaining the exact form of the diffracting body.

Another paper was communicated to the Section by Sir David Brewster, 'On the Combined Action of Grooved Metallic and Transparent Surfaces upon Light.'

The phenomena described in this paper, discovered by the author, were altogether new and of a very remarkable description. The spectra, produced by the methods which were explained to the meeting, were covered with bands like those produced by the action of *nitrous gas* upon the spectrum, and the phenomena varied with the distance of the grooves, with the relation of the dark and luminous intervals, and with the inclination of the incident ray. Sir David Brewster described analogous phenomena and others of a remarkable character, when the grooves were made in transparent surfaces; and he explained to the Section the manner in which he conceived the phenomena were produced, on the principles of interference—an explanation in which Sir John Herschel expressed his concurrence.

Prof. Lloyd asked whether the phenomenon could arise from the retardation of some light in passing through, and the diffraction of the edge causing interference.—Sir David Brewster had merely stated the phenomena, without attempting any explanation.—After a pause, Sir J. Herschel said, that the members must not suppose that the silence which prevailed betokened apathy respecting these splendid researches of Sir D. Brewster; it arose rather from this, that there was extreme difficulty in following with sufficient rapidity for discussion such an absolute torrent of new matter. Indeed, the discoveries of Sir D. Brewster, whether viewed in relation to the intervals at which they succeeded each other or the instruction they conveyed, equally filled us with delight and astonishment.

Sir W. R. Hamilton submitted to the Section 'Some Remarks on the Propagation of Light in Crystals,' as a continuation of those which he had offered on Wednesday respecting the propagation of light in vacuo. By continuing to modify the analysis of M. Cauchy in the manner already explained, he had succeeded in deducing, more satisfactorily than had, in his opinion, been done before, from dynamical principles, a large and important class of the phenomena of light in crystals; though much still remained to be done before it could be said that a perfect theory

of light was obtained. He had employed, for the purposes of calculation, the supposition that the arrangement of the particles of the ether in a crystal, differs from an exactly cubical arrangement only by very small displacements, caused by the action of the particles of the crystalline body; and had attended only to those indirect or reflex effects of the latter particles; which are owing to the disturbances which they produce in the arrangement of the former particles, but he did not mean to assert that he had established any strong physical probability for this being the true *modus operandi* in crystals, though he thought the hypothesis had explained so much already that it deserved to be still further developed.

When it was evident that there would not be any discussion on this paper, the President again observed that the members must be fully aware of the importance of Sir W. Hamilton's views, and that silence was attributable to the general feeling, that the subject was too vast to be at once grasped by any one.

The Secretary then read a Description of an Ancient Compass and Astronomical Box belonging to the President of the Association, His Grace the Duke of Northumberland. The box was exhibited to the Section.

The instrument shows the sun's place in the heavens, the relative situation of the moon, the time the sun is above the horizon each day in the year, the moon's age and time of her coming to her meridian, the rising and setting of the sun, the altitude of the sun, and the day on which the new moons take place throughout the year; it is also provided with a dial plate, and a quadrant for taking the angle of elevation. This instrument has neither the maker's name nor any date attached to it. It might be inferred that it was made in Holland, from the east point being spelt *Est*, and the west point *Vest*, but this was doubtful. However, the variation of the needle being marked nearly one point east proves it to be upwards of 200 years old.

The Secretary read Mr. Snow Harris's Report of Meteorological Observations made at Plymouth, in a letter addressed to the President and Committee of the Section.

GENTLEMEN,—As I cannot possibly attend the present meeting of the Association, a circumstance I very much regret, I am under the necessity of sending you this communication, relative to the progress and state of the meteorological observations with which I have been intrusted.

The meteorological instruments now in operation are as follows:—1. A wind gauge, invented by Mr. Whewell; 2. The wind gauge invented by Mr. Osler, of Birmingham; 3. The barometer; 4. The wet bulb thermometer; 5. The common thermometer. Mr. Whewell's instrument has been carefully attended to by Mr. Southworth, of Devonport. The results of the register, addressed to Mr. Whewell, accompany this communication, in consequence of Mr. Southworth's removal from Devonport. The instrument, together with the wood-work employed in its erection on his house, have been handed over to Mr. Cox, who will continue to attend to it. 10*l.* voted to defray the expense incurred in the erection, repair, &c. of this instrument, since its employment after the meeting at Bristol, have been paid to Mr. Southworth. The wind gauge lately invented by Mr. Osler, and exhibited to the Physical Section at the last meeting, at Liverpool, has at length been set up in a very excellent situation at the house of Mr. Cox, optician, Devonport. I am sorry that many unavoidable delays in the manufacture of this machine should have interfered so much with its final completion, that I am unable to send any well digested result of its action; it is, however, now at work, and the Association will, I have little doubt, be amply rewarded for the trouble and expense incurred on account of it. 40*l.* was voted for this instrument; of this 30*l.* has been paid to Mr. Osler. The attendant expenses on it have amounted to 20*l.* This includes the erection of an apartment of wood, in which the instrument works—carriage from Birmingham—clock for the register—and sundry other expenses of a minor kind. As the daily register must be carefully attended to, it will be necessary to provide some slight remuneration for the person employed for this purpose; I should, therefore, feel obliged if the Committee would recommend the sum of 10*l.* for the general current expenses of the next year, should they so think fit. The machine appears an extremely valuable one, and when its register is taken in connexion with that of the barometer and the tides, &c., will, I have no doubt, afford very valuable information, since it registers the force and direction of the wind, with the amount of rain, for every instant in twenty-four hours. The barometer is complete up to June last, all the observations having been reduced. I, however, have not been enabled to arrange in tables any more than those of the year ending January 1, 1838. These observations being for one year only, I have thought it undesirable to write any detailed report of them. I may, however, be permitted to lay before the Section, as an approximate result, the march of the atmospheric pressure through one mean day, as shown in Table A, and deduced from 8760 observations, from which some idea may be formed of the probable horary oscillation in this place—a subject of singular interest in meteorology; it appears by the result of the hourly obser-

uations for the year 1837, that the horary oscillation amounts to .0144 of an inch, or about 0.36.

The Hours of Max. being 11 A.M. and 9 P.M.

The Hours of Min. . . . . 5 A.M. and 3 P.M.

The line of mean pressure appears to be crossed four times in the twenty-four hours, viz. between 2 and 3 A.M. and between 7 and 8 A.M., between 12 and 1 P.M. and between 6 and 7 P.M.

The deviations being .0065— for the Max. and Min. A.M.

.0035 + for the Max. and Min. P.M.

The negative sign indicating the depression below the line of mean pressure, the positive sign the elevation above it.

The mean pressure by these observations at sixty feet above the level of the sea, and at a temperature of 55° of Fah. is 29.9532. On the 1st of January, 1839, we shall have completed two years of these hourly observations, when general results entitled to more confidence than those deduced from a single year will probably be arrived at; it seems therefore desirable, in order to avoid too hasty generalization, not to enter further at present into this question. I avoid, for a similar reason, any further notice of the register of the hygrometric thermometer, the observations being in a state of progress only. The register of the ordinary thermometer first contemplated by the Association at York in 1831 is, I am happy to say, complete for five years, and the observations now reduced up to January last. The general results which accompany this communication, and which are exhibited in tables, and curves, must be considered merely as corrections of similar statements exhibited in my first report, the former being arrived at by a more extensive series of observations. It will be seen by an examination of Table XXXII. Plate 3, that the approximations in calculating the hourly temperatures on the supposition that they may be represented by parabolic abscissæ, are much nearer than in the similar table and plate before given. Of 501. voted for these observations, 352, has been spent in defraying the expenses attendant on them up to June last, leaving a balance of 151; part of this has been expended in aid of Mr. Osler's wind gauge. The labour attendant on the reduction and discussion of the observations made hourly with these last named instruments being now very considerable, it becomes necessary to employ competent persons to assist in working out the ordinary arithmetical operations, &c. I would, therefore, suggest to the Committee the propriety of recommending a sum not exceeding 40*l.* for this and other attendant expenses, until the next meeting of the Association, when I hope to have the pleasure of submitting to the Section a full report of the results obtained from the respective registers.

32, Union Street, Plymouth,  
August 20, 1838.

W. SNOW HARRIS.

Sir John Herschel exhibited the curve of mean annual pressure as indicated by the barometer for every hour of the day, and remarked that that little curve conveyed to the mind the very marrow of 8760 observations. For his part, he had never hoped to see so marked a result obtained in this climate. He begged the members also to observe how clearly it indicated to the eye the important fact of the difference between the parts of the diurnal curve belonging to the day and to the night.—Prof. Lloyd had heard that Dove had lately announced a discovery which, if verified by future and full examination, would prove of the utmost importance. By observations with the wet bulb hygrometer, similarly noted for each hour, he has calculated the tension of the vapour in the atmosphere for each hour, and by subtracting this from the total indication of the hourly barometric pressure, he finds, he says, that the variations of the height of the remainder disappears, thus leading to the conclusion that the fluctuations of the barometer were due to the differences of watery vapour contained in the atmosphere alone.—Sir J. Herschel said, if this were so, there would be an end to differences of night and day pressure, to atmospheric tides, and, in fact, to almost all we had been doing for many years.—Prof. Stevelli did not see it in that point of view, for still as the tension of the vapour in a column of air would be different by day and by night, and admit of other changes, these changes would remain in fact the same as before, but be now assigned to an unsuspected cause.

The Rev. Prof. Chevallier exhibited a sheet containing tables and the several formulae and coefficients requisite for calculating heights, by barometric observations.

Prof. Lloyd begged to ask Mr. Chevallier what coefficient he used for the dilatation of air.—Prof. Chevallier replied, that used by General Roy.—Prof. Lloyd said, his reason for asking was, that Rudberg had lately proved the coefficient deduced by Gay-Lussac to be inaccurate.

Mr. Eaton Hodgkinson, of Manchester, detailed several observations on temperature, which he had made within the last year in deep mines in Cheshire and Lancashire; he was not at present prepared to state results, but hoped to be ready at the next meeting of the Association.

Sir J. Herschel asked in which mines these obser-

vations had been made.—Mr. Hodgkinson said, chiefly at Northwich, in Cheshire, of 328, 329, 330, and 360 yards in depth respectively.

Mr. Russell communicated the description of an apparatus for the purpose of showing the connexion of magnetism with the wind, invented by Mr. Watt, of Laswade. He gave this merely at the request of a friend, and he himself knew nothing of the instrument. Four small magnets, in a vertical position, were suspended from a horizontal bar, balanced on a steel point and agate cup. This instrument, placed in a glass shade, had been observed with great care by Mr. Watt, and he reports that it had always the same direction as the wind, and that it had also an annual motion like that of the earth.

#### SECTION C.—GEOLOGY AND GEOGRAPHY. FRIDAY.

This day having been appointed for the geological excursion to Tynemouth, Sir George Back at once took the chair, and called on Major Jervis, an officer who has been employed many years on the Indian survey, and lately selected as its future superintendent, to give an account of the progress and present state of the trigonometrical survey in British India.

Major Jervis began by saying, that the circumstances of India, and its peculiar relation to Great Britain, are sufficient of themselves, in these critical times, to constitute a claim to the attention of the mother country. After some general observations on the importance of accurate geographical knowledge, not merely for its own sake, but with reference to other branches of science, he passed on to the immediate subject of his paper, the trigonometrical survey of India. "You have heard," he said, "Major Portlock explain that we are primarily indebted for these surveys to the exigencies of war. The object of such geography was formerly limited to specific wants, to bring under one view such materials and information as would facilitate the distribution and concentration of troops; or the ready supply of necessities for their subsistence. It continued to be much in the same imperfect state from those early times when the military art was first reduced to some sort of system under the Romans, till the close of the eighteenth century. The maps of those days are, generally speaking, mere itineraries, having more or less precision as they were corrected or not, by astronomical observations. In this state of things, it was reasonable to expect that some knowledge would be obtained of those parts of India, which had been traversed by our armies. In 1759, the want of such maps became apparent to the Government of India, and no pains or expense were spared to procure the best information that could be had. The industry of Colonel Charles Reynolds furnished a surprisingly exact outline of the western part of the peninsula, and a considerable portion of Hindustan, compiled chiefly from native information, corrected at intervals by the latitudes and longitudes of the most remarkable points on the coast. But I should not (said Major Jervis) do justice to the subject, were I to pass over the names of my distinguished predecessors, Reuben Burrows, Colebrooke, Major Rennell, and Colonel Mackenzie; and, to crown the list of these, the names of Lambton and Everest. Major Jervis then passed a high eulogium on the merits and services of these distinguished men; and of Topping, Kelly, and Moncrieff, and incidentally, as the patron of Lambton, on the Duke of Wellington, and continued—An embassy having been sent to China by the British Government, it was thought, as the Chinese prided themselves on the high antiquity of their astronomy, and superior skill, that the grandees of the Celestial Empire would highly prize some good astronomical instruments; and accordingly a fine theodolite, a sector, and a beautiful steel chain similar to that used by General Roy in the survey of Great Britain, were dispatched as presents; but the Emperor declining to see our ambassador Lord Macartney, the valuable instruments were brought back, and put up to public sale at Madras, by Dr. Dinwiddie, physician to the embassy, in part of compensation for his services. At Lambton's suggestion they were purchased on the part of government, and the arc of the meridian in India began by that officer. That great and laborious work has been carried on from that time (1800) to the present,

by Colonels Lambton and Everest. The former died on his post in 1823 at Hinguinagon, at the advanced age of 73, his energies carrying him through to the very last. This great work has been continued with increased activity and advantage by Colonel Everest, and is now on the eve of completion. The total meridional arc is nearly one-sixteenth of the entire circumference of the globe: two series of triangles diverge laterally from the main trunk connecting Bombay and Calcutta, so that the relative positions of three principal places in India are geodetically and astronomically fixed. I am justly proud, he said, of following in the steps of such eminent men; but much remains to be done: the measurement of a parallel arc comparable with the meridional arc, is yet a desideratum. A great variety of scientific data are essentially necessary to the completion of the survey, and there is, lastly, the topography—I wish I could say of the topography as of the geodetical operations, that it was commensurate with the expense that has been incurred on it, or the time and labour which have been bestowed on its execution. The former, the triangulation, probably exceeds every other in extent and accuracy—the latter is the reverse. It is now my duty to fulfil the desideratum; and on looking around me, and consulting every person of eminence in this country, I find from them but one expression, (and my own examination confirms that opinion) that there is not a better model than the Ordnance survey of this country and of Ireland. The system indeed on which the latter is constructed, is peculiarly adapted to India, and I doubt not that the East India Company will eventually adopt it. On this model it is recommended that the topography should be carried on in India; for it is not to be imagined that the present atlas, or the very best maps we have of that country, can afford any insight into its real nature, resources or importance. No one could learn from an inspection of them, that the interior of the peninsula is a vast table land; the western boundary of which is a mountainous range rising to an apex of 8750 feet of elevation above the sea, and decreasing gradually to 1800 at Nassuck, having on its sides nearly all the productions of the spice islands indigenous; nor would he understand that the elevated regions of the Himalaya—that the valleys and hills of the western Ghauts, and the plains of Bengal and the peninsula offer every variety of climate, and by consequence nearly every description of vegetation peculiar to the latitudes from the Equator to the Pole; yet all these particulars, the statistics, the physical and political features, should properly come under the geographer's consideration. We hear of famines, of over-taxation, of insurrections, of idolatry, of the impediments to steam navigation—of the stagnation of commerce;—we hear of these here, and many persons conclude, that the East India Company and the Government of India, are at no pains to obviate them:—far from this, they deeply deplore the existence of these evils, and would gladly resort to any expedient to remedy them. Such remedy, I conceive, is but to be found in a complete and good survey, accompanied with every sort of useful, statistical and geological information which can throw light on that country; and such survey, with proper aid and proper confidence, I think it possible to accomplish in seven years; and I hope to live to perfect it.

Sir George Back said, it was gratifying to hear from the Surveyor General, that there was a prospect of the survey being so soon completed; and he had no doubt, judging from the late liberality of the East India Company, that the information will be made public as soon as it is obtained.—Mr. Greenough observed, that the prospect held out to them, of having the survey of India completed in a scientific manner, was highly gratifying; but he could not lose the opportunity of expressing his wish to see more attention paid to physical geography, and to the representation of the physical features of the earth's surface, on our maps. In this respect, all our maps were very deficient: the continental maps were far superior. Persons who had purchased an atlas, were apt to suppose that they had all that was required; whereas he would wish to see separate maps constructed to show the peculiar physical features of a country.—The Bishop of Durham said, that, with respect to the maps mentioned by Mr. Greenough, he would be glad to know which he (Mr. G.) considered the best.—

Mr. Greenough should observe that the public are not to be misled by the Court of information in pain selection. The same ac England. Special progress exhibit gave a their peculiar the Sax the brief accurate showing map of combin tends—mounts by Mr. by Mr. of Capt Constr Tehnad Have the Q tronom consider parture route, of Clap down. position Lande ing by perton theref return of his he can days, or the By a hours which proper there the ot of wh place not be From tance that p I find days, Tehad Lande this la any a that data a tempt thoug more broug have



Mr. Greenough preferred mentioning the points we should chiefly attend to in a map, rather than praise or blame any particular maps; speaking generally, there was great room for improvement in all of them.

Captain Washington could not but congratulate geographers on the prospect held out by Major Jerri, of having the survey of India completed in seven years; but when we were told that it was seventy-nine years since the first steps for that survey were taken, he considered that we might be fully satisfied, if in twice or three times seven years it really were completed. He fully concurred in the observation of the chairman, that its value would be more than doubled by the information being made public as soon as obtained; and there could be little doubt that such would be the case, as he could cheerfully bear testimony to the recent liberality of the Court of Directors, not only in opening their stores of information to the Geographical Society, but even in pointing out the papers most worthy of their selection.

The Secretary, Captain Washington, then gave some account of the Government Surveys of Austria, England, France, Saxony, Tuscany, &c.

Specimens of the various government surveys, in progress, in the different countries of Europe, were exhibited to the Section; and Captain Washington gave a summary account of their commencement, their progress and present state—noticing any peculiarity in the representation of mountains, as the Saxon map after the method of Major Lehmann—the respective scales—rate of publication, &c.—a brief account also of the recently published, and accurate general map of Australia; and of the South-eastern and South portions, by Mr. John Arrowsmith, showing all the late discoveries in that country—the map of Ireland, in four sheets, by Messrs. Walker, combining all the Ordnance survey, as far as it extends—and lastly, a specimen of a portion of the mountain of Snowdon, engraved in the relief style, by Mr. Freebairn, from a model and drawing executed by Mr. G. Carrington, Ordnance Surveyor.

Captain W. Allen, R.N. read a paper 'On a new Construction of a Map of the Western Portion of Central Africa, showing the possibility of the River Tchadda being the Outlet of the Lake Tchad.'

Having been enabled, during my late ascent of the Quorra, (said Captain Allen,) to determine, astronomically, the positions of several places, I have considered these as fixed points whence to take a departure in laying down the itinerary of Lander, whose route, in his attempt to reach Fandah, after the death of Clapperton, has hitherto never been correctly laid down. One of these points is Dunroora, whose true position having been obtained, enables us to check Lander's itinerary in his journey from Bebeji returning by Zaria: both known points, according to Clapperton, with my corrections for longitude. This, therefore, is the base of a triangle, of which, if he had returned by a different route from the extreme point of his journey, Dunroora would be the apex; but as he came back by the same road as far as Kuttup two days, this town will be the point, where his two routes, or the two legs of the triangle, ought to intersect. By a very careful examination of the routes by the hours which he gives, independently of the bearings, which are vague, and not always given, and making proper allowance for the windings of the road, I find there are 120 miles upon one route, and 121 upon the other; it is therefore almost an isosceles triangle, of which the apex is Kuttup. The position of this place may therefore be considered fixed, if I have not been mistaken in my estimation of the distance. From Kuttup to Dunroora I have laid down the distance to agree with Lander's reported distance of that place from Fandah twelve or thirteen days; and I find this agrees very well with the distance seven days, which was given me when at Dagboh on the Tchadda, between Dagboh and Jacoba. At Dunroora, Lander was in sight of the hill, from the foot of which this latter city is distant half a day. I have not made any alteration to establish a theory; but having found that certain positions have been, from insufficient data at the time, erroneously laid down, I have attempted to correct them to the best of my judgment, though I should wish to have them examined by a more able scrutineer. With the exception of having brought the longitude  $1\frac{1}{2}^{\circ}$  more to the westward, I have left Clapperton's map unaltered. On inspection

of a chart containing Clapperton's route, and Lander's thus corrected, and leaving out of the question, for the present, the asserted direction of the current, I find two extensive basins at the alluvial or common river level, having each a large river flowing through it. Clapperton distinctly speaks of the alluvial nature of the Yeou, as he says that between the banks of the Lake Tchad and Zanjeira, he had not seen even a pebble, and the whole country is subject to inundations. These basins are separated by a small space only, towards which the rivers of Clapperton both point; and Lander says expressly, that a large river flows to the westward, at about thirty miles from where Clapperton left a branch of the Yeou. Lander's river flows past Jacoba, and the Tchadda comes from Jacoba. In my opinion, therefore, there is strong presumptive evidence of the continuity of this large river under its various names, probably generic. In addition, the natives say, that Lander's river, the Tchadda, comes from the or a Lake Tchad, or from where the Yeou is known to be; and that the Yeou comes from where the Tchadda is known to flow. The accounts are conflicting as to the direction of the current, but go to prove the identity of the rivers. Denham declares the lake to have no outlet, though it is perfectly sweet; and that the Yeou flows towards the lake at the rate of three or four miles; but he describes it as very winding, sometimes sluggish, and everywhere difficult of access. It is hard to dispute what a traveller gives as ocular testimony; but I must say, that it appears to me probable that there is a continuity of river from the Tchad through the basins of Clapperton and Lander to the Tchadda; and I know that this river flows to the westward at one extremity, since I traced it nearly one hundred miles upwards from its confluence with the Quorra. Therefore, on this presumption of its continuity, he must have been mistaken about the direction of the stream at the other extremity; and I cannot help recording my opinion, that this river is the outlet of the Lake Tchad, affording a communication by water to the centre of Africa, alike important to commerce, to science, and to humanity.

'On the Position of the City of Cuzco, in Peru,' by J. B. Pentland, Esq. H.M. Consul in Bolivia: communicated by Captain Beaufort, R.N., Hydrographer to the Admiralty.

In this brief notice, Mr. Pentland states that he has just returned from a two months' tour into the southern provinces of ancient Peru, during which he has visited the capital, Cuzco, and the many interesting localities round that imperial city, following a route hitherto untrodden by scientific travellers. In the course of this journey he had fixed the position of the city of Cuzco, whence it appears that the Temple of the Sun, now the church of San Domingo, is situated in latitude, south  $13^{\circ} 30' 55''$ , long. west of Greenwich,  $72^{\circ} 4' 10''$ , and at an elevation above the sea of 11,380 feet. Mr. Pentland had also determined the position of all the principal places between La Paz and Cuzco, and of the western shores of the great inter-alpine lake of Titicaca.

Sir George Back then said, the next paper was connected with a subject in which all would feel a deep interest, namely, the practicability of the navigation of the river Euphrates. It must be well known to every one present, that a rich harvest of geographical knowledge had been one of the many advantages of the late expedition to that river; and he only regretted the absence of its gallant and persevering leader, who had kindly communicated the most recent intelligence received from that quarter, and had lent his original maps and sections to be laid before this meeting of the British Association; and the details of which would be explained by the Secretary.

'On the recent Ascent of the River Euphrates,' by Lieut. Lynch, Ind. Navy: communicated by Lieut.-Col. Chesney, R.A.

This letter, dated Hit, June 1, 1838, described the facility with which the steamer had ascended the river from Basrah to that place: between Hillah and Hit the Euphrates is a broad, deep, and beautiful stream, in some of its bends nearly a mile wide—the country extremely fertile—the crops of corn abundant, and just reaped—the population of Arabs along the banks extensive, and apparently happy, welcoming the approach of the steamer with shouting and dancing, and

supplying its wants of fuel with great readiness and cordiality. The productions of the country, as wool, naphtha, bitumen, ghi or butter, tallow, corn in abundance, and horses of the finest breed, are mentioned as easy to be obtained, and in large quantities; and the letter concludes with an expression of the writer's conviction that a profitable trade might easily be established; and, after the experience he has had of the river, that there are no physical obstacles to its free navigation with properly constructed vessels. An explanation was then given of maps which were exhibited, and particularly of that showing the line of levels carried between the Mediterranean at Iskanderun and the river Euphrates at Birehjik: whence we learn that the city of Antioch is situated 300 feet above the sea—the town of Birehjik, 628 feet; and the highest point between the sea and the river rises 1720 feet above the Mediterranean.

Captain Washington said, that whatever use might be made of the fact of the practicability of the free navigation of the Euphrates, it was not our province to inquire; but, as geographers, we had much cause for congratulation, as, owing to the labours of the zealous officers and men who composed this expedition, we had obtained materials for a correct map of a large portion of northern Syria; northern Mesopotamia had been explored; and the survey of the river Euphrates, from Birehjik to its outlet in the Persian Gulf, a distance, including windings, of about 1200 miles, had been effected: thus affording a certain base line, extending in a N.W. and S.E. direction, through  $7^{\circ}$  of latitude and  $12^{\circ}$  of longitude, from Iskanderun to Basrah, whence all future travellers may confidently take their departure when exploring either to the northward or southward of it, and remember with gratitude what they owe to their countryman, Lieut. Murphy, of the Royal Engineers, whose life fell a sacrifice to his exertions, and the climate, at Basrah.

**Geological Excursion.**—Two steam boats were prepared by the Local Committee, for an excursion to Tynemouth and Cullercoats. At seven o'clock a.m. about two-hundred gentlemen left the quay; and on their arrival at Tynemouth, partook of an excellent breakfast which had been provided in two large rooms of the barracks. After breakfast, many gentlemen, and even ladies, from Newcastle and the neighbourhood, joined the party—which then proceeded, under Tynemouth Castle rock along the shore to Cullercoats; Mr. Hutton and Prof. Sedgwick acting as leaders, and explaining, as they advanced, every object of interest which presented itself. The party halted repeatedly, while Prof. Sedgwick directed attention to some singular phenomena there exhibited. A more picturesque scene can hardly be imagined, than the Professor mounted on the beetling cliff, overhanging the vast ocean, with the listening hundreds assembled around him. After viewing the magnesian limestone, and associated red sandstones, the wonders of the ninety fathom dike, and the marl-slate beds at Whitley quarries, with their fossil fish, which had been opened up for the occasion, the party returned to Newcastle, much instructed, and highly delighted.

#### SATURDAY.

As the Section must of necessity be closed before one o'clock, when the Meeting of the General Committee was to take place, it was decided that the members, instead of reading their papers as originally intended, should briefly and verbally direct attention to such original points only as they most desired to submit for consideration.

Dr. Buckland exhibited and explained enlarged sections copied from Cotta's recently published sections, showing granite and syenite overlying strata of the chalk formation at Hohnstein, Oberan, and Weinbühle, in Saxony; and laid on the table Mr. Cotta's work, in which they are described.

Mr. Nicholas Wood made some observations on the sandstone of the Tweed and of Carlisle. His object was to show that the sandstone, which, in the one place, was above the magnesian limestone, was, in the other, though not far removed, below it. The argument was illustrated by reference to coloured sectional drawings.

Mr. Smith (of Jordanhill,) communicated a notice regarding the organic remains of the newer Pliocene

formations of the British Isles.—Prof. Ehrenberg exhibited his new work on recent infusoria, which is illustrated by sixty-four highly finished folio plates; also specimens of the flint, semi-opal, tripoli, &c., in which he has discovered such myriads of fossil infusory animals.—Mr. Witham adverted to the occurrence of rolled stones in the main coal seam of Cockfield Fell Colliery.

Mr. Sopwith briefly explained the sections of the mountain limestone formation of Alston Moor, exhibiting the general uniformity of the several beds. Mr. Sopwith stated, that these sections form a portion of illustrations of the stratification across the island from the German Ocean at Sunderland, to the Irish Sea at Whitehaven, which could not be completed in time for the present meeting, but are now in progress for a subsequent meeting of the British Association. This series of sections will comprise the coal district of the county of Durham, by Mr. Buddle—the lead mine district, by Mr. Sopwith—the Cumbrian groups of mountains, by Prof. Sedgwick—and the Whitehaven coalfield, by Mr. Williamson Peile.—Mr. Sopwith also exhibited a geological model of Dean Forest, in which the surface of the country and the succession of the various strata are exhibited by separate and moveable pieces of wood. This model was constructed for the purpose of conveying information to the Commissioners of Woods and Forests. It comprised an area of thirty-six miles, showed the undulating surface of the country, and, on removing the upper surface, exhibited the various strata, the position of the various beds of coal, &c. Dr. Buckland, Prof. Sedgwick, and others, bore testimony to its beauty and accuracy. Dr. Buckland observed that one advantage of this model was, that it made the Commissioners of Woods and Forests acquainted with every particle of coal under the forest, so that not a bit of it could be wasted or destroyed without their knowledge; it also showed them where and how it ought to be worked, and by that means would enable them to prevent a recurrence of that horrible loss of life and destruction of property which had hitherto so frequently taken place. Mr. Sopwith begged to add, that one of the uses of such models was to point out the partitions of mining property, and prevent trespass. In cases where two mining properties joined each other, it was extremely difficult to keep the workings of one clear of the other. He remembered a case in which such a model would have saved 40,000 guineas. A lease was taken of part of a mine, and a condition was attached that a guinea should be paid for every square yard of coal taken in trespass; and it so happened that the workmen mistook their way, and worked the coal in one direction, whilst they imagined that they were working in a diametrically opposite direction, and 40,000 square yards of coal were wrought before the mistake was found out.

Mr. Jukes gave a brief account of the rocks along the southern boundary of the Penine Chain.—Mr. Austen made some remarks on geological evidence and inferences.

Dr. Adams communicated some observations on Peat Bogs, the purport of which, we believe, was, that by burning off the surface and sprinkling the subsoil with sulphuric acid, it would become fertile, and that the surface moss, if removed to the farm yard, and also sprinkled with sulphuric acid, would become excellent manure.—In reply to a question by Prof. Buckland, Dr. Adams said, that in some parts of Ireland it was the custom to burn off the spongy part, sprinkle the acid over the ground, and it became prolific. The moss was also prepared in the farm yard.—Major Portlock said he was aware of the practice, but he believed it was done, not only for the purpose of converting the peat into manure, but also to correct some deleterious qualities in the peat.—Prof. Sedgwick suggested that something should be distinctly ascertained, and communicated to the Association at their next meeting, for the subject was one of importance. The principle, no doubt, was, as Major Portlock had stated it, to destroy bad vegetation by means of poison. It must be recollected, however, that the peat moss was of the utmost value to the poor peasantry of Ireland.—Mr. Bates said that he had tried a similar experiment thirty years ago, and in the first year the piece of ground was rendered very prolific. But he tried it the next year, and did

more mischief than he had in the first instance done good.

#### SECTION D.—ZOOLOGY AND BOTANY.—FRIDAY.

'On the Sternoptixinae, a Family of Osseous Fishes,' by Dr. Handyside, of Edinburgh.

The writer commenced by giving a sketch of the history of this family, and especially of the genus *Sternoptix*. He then entered into a minute description of a new species belonging to this genus, which he proposed to call *S. celebes*, distinguishing it from *S. Hermani* and *Offersii*, to which it most nearly approached. The following diagram was exhibited as showing the position of this fish:—

Osseous Fishes.

Subdivision, Malacopterygii Abdominales.

Family 4.—a. Salmonidae.

b. Sternoptixinae.

Genus 1. *Sternoptix*.

Species a. *S. Hermani*.

g. *S. Celebes*.

Genus 2. *S. Offersii*.

The paper was accompanied by a dissected specimen and several drawings. The author stated that he was indebted to Dr. Richardson for the arrangement in the above analysis.

The next paper was 'On the Distribution of the Terrestrial Pulmonifera in Europe,' by Edward Forbes.

The geographical distribution of Mollusca, said the writer, though a subject of great interest, has hitherto been almost neglected both at home and abroad. By exhibiting a slight sketch of the distribution of the Terrestrial Pulmonifera in Europe, the result of personal observation in various parts of that continent, I hope to draw the attention of British naturalists to the subject, more especially to the distribution of the Mollusca in Britain. Judging from the materials which we at present possess, Europe may be divided into several great tectonological divisions, each of which possesses a distinct character of its own, arising in all probability from climatic causes. The first of these divisions comprehends Scandinavia, Finland, Northern Russia, the greater part of the British Isles, and Iceland, and extends itself into America in Greenland. The second, Germany (except Austria), Holland, Belgium, the south of England, the greater part of Switzerland, and northern and central France. The third, south of France, the Peninsula, the west of Italy, the western Mediterranean Isles, and extends itself into Africa (in Barbary), even to the Canaries, where a more tropical Fauna commences. The fourth comprises the east of Italy, Turkey, Greece, Dalmatia, and Wallachia, and extends itself to Asia Minor, and probably Syria. The fifth includes southern and perhaps Central Russia, extending itself over the Caucasus to Georgia. Besides these divisions, there is a large and important tract of inland country, including Austria, Hungary, Styria, Carinthia, and the eastern Tyrol, which must either be regarded as a separate division or as the result of a combination of some of the modifying influences which I shall presently allude to. The cause of the peculiar malacological character of each of these divisions appears to lie in what I shall call the centralization of genera, or of minor groups. Throughout the world it will be found that every genus has a generic locality, that is to say, that in a certain country its species predominate more than in any other part of the globe, and the typical forms of each of its groups are there represented. In Europe, we have a beautiful instance of this phenomenon in the genus *Clausilia*, as seen in the division I have numbered as the fourth. Each group has often several capitals or centres. The distribution which I have just sketched out, and which appears to be mainly climatal, is materially influenced by certain modifying phenomena, which must be especially guarded against and marked out by naturalists. These modifying influences may be stated as five: viz. 1, soil and rock; 2, mountain; 3, elevation; 4, sea; 5, transportation. The first, or geological influence, is of great importance, so much, indeed, that a malacologist might almost name the structure of a country from the land shells inhabiting its surface. The rocks which have most influence are those of calcareous structure, and even the different formations of limestone rocks supply localities to species peculiar to themselves. The second, or influence of mountain, must not be confounded with the third, or influence of elevation. The former exists in Britain; of the

latter I have as yet seen no traces. The influence of the neighbourhood of the sea is seen in the case of certain helices and bulimi, which never thrive inland. The fifth is rather a class of influences than a single influence, including as it does the effects of man's agency in the introduction of species, both for domestication or by accident as by ballast, which at the present moment is exercising a most important influence on the British Fauna and Flora; and the effects of natural agency, as in the transportation of species by rivers, &c. The effect of these modifying influences is the multiplication of the individuals of a species. There is also a climatic influence, which must perhaps be classed along with these, and the result of which is the superior development of size and colour in certain species. Now, what I wish, is the co-operation of the naturalist members of the British Association in obtaining data for the investigating the distribution of the land and fresh-water Mollusca of Britain, and for the ascertaining how far the above-mentioned influences affect our Fauna. For this purpose, he exhibited a map of Great Britain and Ireland, divided into districts, drawn up by Mr. Brand, of Edinburgh, for the Botanical Society of that city, with a view to the classification of the distribution of British plants. It is constructed on the most philosophical principles, and does the highest honour to its author. It would be well, the writer said, to use the same map in investigation on the distribution of all departments of the British Fauna, as we never can arrive at just views by the study of one department alone. At present, the catalogues of British districts are almost unavailable (with the exception of Mr. Alder's, who first cleared up the difficulties surrounding the study of our land and fresh-water Mollusca), in consequence of no notice being taken of the effects of modifying influences.—Mr. Forbes exhibited some maps, in which he had endeavoured to mark out the zones of climate.

Dr. Richardson referred to the well-known fact, that Humboldt experienced in travelling upwards the same changes of temperature, vegetation, &c. as in travelling northwards. In drawing up statements of the distribution of animals and plants, this point was important.—Sir W. Jardine stated that the drawing up of accurate local Faunas would greatly facilitate our knowledge of the general distribution of the animal kingdom; and he was happy to say that he knew several were in preparation.—Mr. Forbes was afterwards requested by the General Committee to draw up a Report on our knowledge of the Geographical Distribution of the Mollusca.

The next paper was, 'A Notice of the Annual Appearance of some of the *Lestris* Tribe (Arctic Gulls), on the coast of Durham,' by Edward Backhouse, Esq. Sunderland, 1833.

He stated, that from observations made during a series of years in the neighbourhood of the Tees' mouth, he had found that the *Lestris richardsonii* is the earliest of the genus in its appearance on these shores, when on its southern migration. That the young birds seem usually to arrive in the beginning of the ninth month (September), and in the middle of the same month, the adults accompanied by the young of *Lestris pomarinus*, make their appearance, continuing abundant for about three weeks, when they are succeeded in the middle of the tenth month (October), by the mature *Pomarine Skuas*; these, as far as he had been able to observe, continue for the like space of three weeks, and then disappear. He last year met with *Lestris pomarinus* in its mature state, in considerable abundance off Hartlepool and the Tees mouth. It is a much more powerful bird than *Lestris richardsonii*, not hesitating to attack the larger gulls, while *Lestris richardsonii* seems to confine itself to terns and the smaller species of gulls. Early in the autumn of 1836, he obtained in the same locality a specimen of one of the *Lestris* tribe differing from any he had before seen. It was in the immature plumage, very much in its markings resembling the young *L. pomarinus*. In size and proportions it nearly approaches *L. parasiticus*, (the long-tailed Arctic Gull,) but not having met with any description of the young of that bird, noticing the end of the produced tail feathers being rounded, (a character in which it strikingly differs from the immature *Lestris richardsonii*), he should have been inclined to consider it the young of a small species, with rounded tail

feathers, being the castle corner of L. p. the collection is induced.

Its adult Length Expanded Elongated Bill from Length of month Length of Middle toe

*Lestris* through

Mr. So the young that there of Mr. S. bird; he ton thou British, which he the *Lestris* should be a series

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feathers, had such an one been known; but that not being the case, and having since he came to Newcastle compared it with a nearly matured specimen of *L. parasiticus* shot near Sunderland, now in the collection of John Hancock, of Newcastle, he is induced to consider it to be the young of that bird.

Its admeasurements are:

Length .....	17 Inches.
Expanded wings .....	32
Blaghted tail feathers project .....	0½ths of an inch.
Bill from the forehead to the tip .....	1
Length of the bill to the gape of the mouth .....	1½
Lengths of Tarsi .....	1½
Middle toe .....	1½

*Lestris Catarractes* (Great Skua) is also met with, though rarely, on the same coast.

Mr. Selby had no doubt, that the bird alluded to was the young of *L. parasiticus*. Mr. Thomson observed, that there had been some doubt as to the correctness of Mr. Selby, in figuring *Lestris arcticus* as a British bird; he had, however, shot one at Belfast.—Dr. Charlton thought all the *Lestris* tribe might be considered British. There were two of these birds distinguished, which he thought the same, the *Lestris Buffonii* and the *Lestris Richardsonii*. He thought the first name should be retained. The Rev. L. Jenyns exhibited a series of specimens of the square-tail Shrew (*Sorex tetragonurus*, Herm.) and pointed out the distinguishing characters between it and the common Shrew (*S. rusticus*, Jen.) He also exhibited a specimen of the Chestnut Shrew (*S. castaneus*, Jen.) which he had formerly considered as a mere variety of the *S. tetragonurus*, but of which he had now seen three individuals, and which he was satisfied deserved to rank as a distinct species. It is principally characterized by the bright chestnut colour of the upper parts,—though there are other differences in the tail and in the form of the cranium. It was observed generally that the characters of the cranium were found of great assistance in determining the several species of this genus.—Mr. Jenyns also exhibited two undescribed species of the genus *Cimex* as restricted by entomologists of the present day. One of these, which has been alluded to by Latreille, though never characterized, was found inhabiting in great numbers the nests of the common house martin. The other was taken from a Pipistrelle Bat. It was proposed to call these two species *C. hirsutinus* and *C. pipistrelli*. At the same time the peculiar characters were pointed out, by which each was distinguished from the other, as well as from the *C. lectularius* of authors, or common Bed-bug.

The subject which ought now to have come before the meeting was the report of Mr. Owen, on the Marsupialia; but, as the time was short, Mr. Owen merely stated the results he had come to in the course of his investigation. The report, he said, was drawn up under three heads: first, the zoology of Marsupialia; secondly, their relation to other Mammalia; and, thirdly, the peculiarities of their reproductive economy. 1. With regard to their zoological characters, they presented as many forms, and as varied habits, as all the Carnivora put together. In their kind of food they were very various. Some were entirely carnivorous, as those of New Holland. Some are insectivorous, like the *Orycteropus* and *Myrmecophaga*, among the other Mammalia. A species of these is described by Captain King, as having a divided hoof like the Ruminantia. Some of them are arboreal, as the *Didelphis* and *Perameles*. Many of the Marsupialia are strictly herbivorous, as the kangaroo-rat, &c. He thought, however, with all the varieties of character and habit presented by these animals that they had been too largely subdivided by zoologists. 2. In regard to their relation to other animals, he was of opinion, that they ought to be considered as one group. For although they differed so greatly in some respects, still, they agreed in so many remarkable points, that they could not be consistently separated. Of these points the most remarkable were the development of the hind legs, the existence of the marsupial bag, the circulatory apparatus being less perfect than the rest of mammalia, the blood being returned to the heart by two veins, as in the hearts of reptiles and birds; and in the hemispheres of the brain, which are not united by a corpus callosum: in this last respect, they are like the

oviparous division of vertebrate animals, a fact first pointed out by Mr. Owen. In this they have the same relation to Mammalia, that the Batrachian have to the Ophidian, Saurian, and Chelonian, divisions of reptiles. 3. The reproductive economy of these animals was slightly touched upon. It had been supposed, that the young were produced by budding from the marsupial pouch, but this was now proved to be erroneous, and the first stages of their uterine growth were known to be like that of other Mammalia.

Mr. Owen then entered into some geological account of these animals. Dr. Buckland had found the jaw of an animal in the stonefield strata, which, from a peculiar mark only seen in the jaw of Marsupialia, could be well identified, and probably belonged to the present genus *Opossum*, or *Didelphis*. Major Mitchell has in his collection a large number of bones, belonging to extinct genera of Marsupialia. From the jaw of one of these animals, there is reason to conclude, that its possessor must have been double the size of any species of kangaroo existing at the present time.

On a new species of Smelt, by Mr. Yarrell.

In the month of November 1837, Mr. Yarrell received from Mr. William Ewing, of Glasgow, a specimen of a smelt, which was at the first glance so obviously different from our long known and esteemed favourite, as at once to claim for it the title of a distinct species; and the specimen was the more interesting, from the circumstance that this fish is not only new to our own country, but is also entirely new to Ichthyology, no second species of the genus *Osmerus* having hitherto been made known. The gentleman just named passed part of the summer of 1837 near Rothsay, in the Isle of Bute; and the fish in question was brought to him by a fisherman, who stated that he caught it with a hand line in the bay of Rothsay, about 200 yards from the shore, in twelve fathom water; that it was, though well known, but rarely seen; that specimens varied from 6½ to 8 inches in length; that they were full of roe in June, and when first caught the cucumber-like smell was very apparent. In this new species the jaws are of equal length, without teeth upon either, but there are four long teeth upon the tongue; the eye very large; the upper surface of the head convex; the form of the posterior edge of the operculum circular; the dorsal fin commencing half way between the point of the nose and the anterior edge of the adipose fin; the anterior edge of the adipose fin is at the end of the second third of the space between the dorsal fin and the end of the fleshy portion of the tail; while the ventral fins, which are in the middle of the whole length of the head and body in both species, are by the proximity of the first dorsal fin to the head in the new smelt, brought in a vertical line underneath the posterior edge of the first dorsal fin; the anal fin, like the adipose fin above it, commences much nearer the tail than in the common species; the ends of the caudal rays not tipped with black. The number of the various fin rays are as follows:—D. 11, P. 14, V. 12, A. 12, C. 19. The form of the body is elongated and slender; the lateral line straight; above it, the colour of the body is of a pale yellowish green; below it, is a broad longitudinal stripe of bright silvery white, passing by a shade of yellowish olive to an iridescent silvery white on the belly. To identify this species with the locality from which it was derived, the author proposed to distinguish it by the name of the smelt of the Hebrides—*Osmerus Hebrideus*.

Mr. Thomson had not seen any species of *Osmerus* in Ireland, but had obtained an *Atherina*.—Mr. Strickland objected to the use of the names of places as specific names of plants and animals, thinking it led to confusion.

A letter was then read by Dr. Richardson, the Secretary, from Mr. Jerdan, suggesting that botany should be made more generally and "comprehensively" applicable to agriculture; especially in the cultivation of food for animals. The author thought that animals knew what was best for them, and that their likings should be paid attention to. He observed, for instance, that dandelion was good food for the cow, also spargula; agrostis was good for horses; the trichium, for snakes; lambs hated colchicum. After some further observations of a like character, and enforcing his argument, the author finished by recommending the subject to the attention of the Association.

The Rev. F. W. Hope read a paper 'On Noxious Insects occurring in the year 1838, more particularly the *Tipula tritici*, of Kirby.'

The author commenced his observations on the apple blight. In this year apple trees have chiefly suffered from the attacks of two insects; one is a beetle (*Anthonomus pomonum*), which attacks the blossoms in bud, and prevents the fruit from what is called "setting." It is well known to entomologists, and the author hopes shortly to give its history to the world with illustrations. The second is the *Aphis*, or plant-louse, which is this year exceedingly abundant. The apple, the hop, and the wheat, have suffered from it. The author would not describe these insects, as they are so well known, but made the following observations:—When vegetation in spring has made considerable advances, and the weather becomes wet and ungenial, then Aphides appear in greatest abundance. He attributes the great abundance of Aphides this year to the cold. He was anxious to ascertain if Aphides are more abundant in some soils than others, and solicited information on this point. In 1829 the Aphides were succeeded by the Coccinellide: is this usual? The Aphides on the wheat this year are more abundant on the spring than the autumn sown wheat, and (near Cheltenham) more numerous on bearded wheat. *Tipula tritici* is observed to be abundant in some districts. The pupa and chrysalides are not so numerous as in former years, but the caterpillars are very abundant; but the wheat appears more damaged by Aphides than *Tipula*. The author then alluded to the kind of information wanted in these inquiries, with regard to soil, atmosphere, cultivation, and varieties of wheat, which might be supplied by the agriculturist; and regretted that there was not an Agricultural section in the Association. He then hoped botanists would supply information:—1. On the species and varieties of wheat grown in this country; 2. Diseases of wheat arising from parasitic fungi and other causes; 3. The provincial and local names of the kinds of wheat. In conclusion, he suggested that a committee of the British Association, consisting of botanists, entomologists, and agriculturists, should be formed, in order to investigate the diseases incident to wheat, and other kinds of agricultural produce.

Prof. Graham observed, that this subject was of great commercial as well as scientific interest. The increase of destructive insects this year had been very great. What was the reason? It could not be the cold winter that produced them on wheat, for the spring sown wheat had been most affected. We wanted a collection of facts on this subject, in order to deduce something like general principles. He had seen a large collection of drawings formed by Sir Joseph Banks, from the inimitable pencil of Francis Bauer, representing the various insects that destroy or injure plants. He thought this Association could not do better than assist in publishing these drawings, which would greatly promote our knowledge of this subject.—Dr. Greville remarked, that many Aphides which were abundant last year were scarce this, and vice versa. Sir C. Monk had observed the attacks of certain insects to be periodical, and detailed some facts in illustration.—A member observed, that the rate of growth of a plant affected its liability to the attacks of insects. If they grew fast, the insects could no longer remain on the growing point of the plant, and thus were prevented doing much injury.—Mr. Richard Taylor confirmed this opinion.—The Rev. Mr. Hope thought the weather made little difference in the appearance of these insects. Where vegetation makes sudden strides, the *Aphis* is frequently abundant. But if, at the same time, the plant was healthy, the *Aphis* did not prosper.

Dr. Richardson then exhibited four species of Pouch Rats, and he was aware of the existence of two more. They were usually looked upon as the same species.

In conclusion, we may observe, that on Monday a small party of the botanists joined in an excursion to the coast. They were conveyed from Newcastle to Cleland by coach, and then walked along the shore to South Shields. This district is not particularly interesting to the botanist; it being neither sufficiently elevated to produce alpine or sub-alpine

plants, nor sufficiently irregular to offer much variety. Amongst the rarer plants picked up by the party, were the *Atriplex rosea*, *Campanula hybrida*, *Silene noctiflora*, *Galium tricornis*, and *Hieracium molle*. The coast in this district is very beautiful, presenting, at Marsden, a fine series of rugged cliffs. The rocks, washed by the sea, afforded abundance of *Algæ* and *Fuci*, but none occurred which were noticed as rare.

#### SECTION E.—MEDICAL SCIENCE.—FRIDAY.

Dr. Bowring was introduced to the Section for the purpose of communicating some observations on Plague and Quarantine, made during his residence in the East.

Dr. Bowring apologized for coming before the Section, he not being a medical man, but having travelled in the East for the purpose of observation in reference to our commercial relations, his attention had been naturally directed to the subjects of plague and quarantine—subjects the importance of which could hardly be overrated, many millions being annually lost to this country from quarantine regulations. The results of his observation had produced a strong conviction of the non-contagion of plague; and he thought it right therefore, to lay before this Section a few remarks on the subject. He alluded to the very secondary character of the facts, on which the prevalent opinions were founded. Some were so absurd as not to be worthy of the slightest attention: such as plague being introduced at Leghorn, by the unrolling of a mummy, that had been buried for 2000 years,—at Constantinople by the wing of a bird having touched a kite which a boy was flying from a house top,—from a cat having been seen to jump into a basket in which were some clothes, from which the disease was subsequently caught. Dr. Bowring said, that physicians residing in the East were rapidly changing their opinions on the subject, but they were prevented in many instances from freely expressing them, by the interested Boards of Health, who neither liked to part with their extensive power (even of life and death), or with their salaries. Clot Bey was a decided anti-contagionist, and that after an experience of 8,000 or 10,000 cases. Dr. Bowring mentioned many cases where facts were distorted, or invented to account for cases of plague from contagion; and in one remarkable instance, where the misrepresentations were exposed, it was denied that the case was plague at all, because they could not maintain their assertion of contact having taken place. The Mussulmans are by their religion non-contagionists, and Dr. Bowring hoped they might never become otherwise, as the aggravation of the calamity would be tenfold if they did. The opinion as to the contagious nature of the disease prevailed principally amongst the Levantines and Franks; but every other superstition was as readily believed by them. He had collected the most solemnly attested evidence of the appearance of *Peris* and *Genii*, and of the intermarriages of the former with mortals: he had collected more strongly-attested facts on these subjects, than on the contagious nature of plague. Dr. Bowring asserted that, from innumerable instances, quarantine appeared to give no security, and was of opinion that these establishments were mere political engines, of great power and convenience in a despotic country. In the lazarettos the whole correspondence of the East was read. The Russians had a most perfect system of quarantine, yet the plague got into Odessa. In 1831 quarantine and lazaretto establishments were introduced into Egypt, under the superintendence of the Consul, yet the plague got into Egypt. In Jaffa it broke out in the house of the Russian Consul spontaneously, and in Jerusalem in a convent, with which there could have been no communication. In the lazarettos, a little disease was made a great deal of; in one instance a greater number died from dysentery than from plague. Lazarettos, he contended, rather increased than diminished the evil. If a strict separation could ensure safety, the Pacha's harem would escape; yet in 1835, seven died there of plague. It appeared at one time in Old Cairo, and not in New, and *vice versa*, although there was constant communication; the same was true as to Cairo and Alexandria. The disease never penetrated Nubia, though constantly on the borders, and frequent intercourse taking place. In Cairo on one

occasion 400 or 500 houses, whose inhabitants had all perished, were subsequently opened, the linen and clothes in them sold in the market-place, without any cases of plague resulting. Clot Bey had again and again inoculated himself without producing the disease. Dr. Boulard wore the clothes of a patient, who died of the disease, for twenty-four hours, without catching it. The following information was communicated to Dr. Bowring, by a physician of long experience, in answer to a series of direct queries, viz.: that it is indigenous in Egypt, never entirely absent, never imported, that it frequently occurs spontaneously, that cordons afford no security, that contact very frequently did not produce it, and that the most cautious frequently suffered from it, that free ventilation was effective in checking the disease, that it was not produced by linen which had been exposed to the infection, and that when a number of persons exposed to its influence removed from the spot, the mortality became much diminished. Dr. Bowring concluded by expressing his own strong conviction on the subject; but he had no object but to promote the discovery of truth, which could only be done by patient and serious inquiry, and by evidence of a primary character.

Dr. Lynch begged leave to propose a resolution, to the effect, that Dr. Bowring's paper should be published.—Mr. Greenhow could not but remark on the strong analogy, which existed between the statements of the learned gentleman on plague and lazarettos, and the events which occurred in this district relative to cholera and cholera hospitals. He also requested Dr. Bowring to furnish a copy of his observations to the Secretaries.—Dr. Granville opposed the motion of Dr. Lynch. The communication he contended was not strictly medical; it was political, not pathological: he must oppose too the deductions of Dr. Bowring; he was not indeed present at the commencement of his address, but that was the less necessary as he had heard the whole subject in detail, on board the *Ocean* steam-packet. It was not by declaiming on the superstition of the Levantines, or by the eloquent introduction of *Peris*, *Genii*, and Vampires, that a strictly pathological question could be decided, nor by false inferences from bad Boards of Health.—The Chairman interrupted Dr. Granville, by protesting against this line of personal attack, and allusion to what had taken place elsewhere. After some desultory observations, Dr. Lynch's motion, somewhat modified, was passed. Dr. Granville then begged leave to propose that the Committee should make application to Her Majesty's Government for a grant to be applied to the purposes of inquiry into the important subject of the contagious or non-contagious nature of plague. This motion passed unanimously, as also one of thanks to Dr. Bowring.

Mr. Goodsir then read a paper 'On the Origin and subsequent Development of the Human Teeth.' The author has observed dentition commence by the formation of what he denominates the primitive dental groove, on the floor of which the rudiments of the pulps of the milk teeth appear as globular or conical papillæ; septa afterwards pass from the outer to the inner side of the groove, between the papillæ, and thus each of the latter becomes situated in an open mouthed follicle, which is the primitive condition of the future sac. After the formation of the milk follicles, the lips of the groove still remain prominent; and when in this condition he denominates it the secondary groove. The rudiments of the ten anterior permanent teeth appear as little depressions in the secondary groove, internal to the mouths of the milk follicles. The papillæ of the milk teeth now begin to be moulded into the form of pulps, a change which is synchronous with the closure of the mouths of the follicles by two or more laminae, which agree in number, shape, and position with the cutting edges and tubercles of the future teeth. The lips and walls of the secondary groove now adhere, except in the situations of the ten depressions for the permanent teeth, and for a small extent posteriorly on each side, where a portion of the primitive dental groove remains in its original condition. In this portion the papillæ and follicle of the first large molar tooth appear, and, after it closes over, the lips of the secondary groove above it adhere, but not the walls; so that there is in this situation a cavity which produces the sacs of the two posterior permanent molars. The first large grinder may, therefore, be

considered in some measure a milk tooth. The author observes, that dentition begins, and is always in advance, in the upper jaw, except in the case of the incisive teeth, which, although they appear first, are later in coming to perfection. This he explains by the tardy development of the lateral elements of the intermaxillary system. The author divides dentition into three stages. The first is one with which anatomists have hitherto been unacquainted,—viz. the follicular. The second and third they are familiar with—the sacular and the eruptive. From his researches, he concludes that the human teeth originate from mucous membrane; that the permanent teeth have no connexion with the deciduous set, and that the sac and pulps must be referred to the class of organs denominated bulbs. He anticipates the discovery of the follicular stage in the dentition of all animals, and if so, that it will explain the varying and complicated forms of the pulp and sacs.

Dr. Dalziel brought before the Section a model of an apparatus for the purpose of promoting respiration during sleep. Its object was to diminish the amount of atmospheric pressure on the surface of the body, while the patient was respiring atmospheric air of the usual density; and this principle might be applied in various diseased states with benefit, and particularly to the recovery of individuals labouring under suspended animation.—On the motion of Dr. Knott, it was resolved that the apparatus be recommended to the notice of the Humane Society, for the purpose of making trial of its efficacy.

A paper, entitled, 'Experiments and Observations on the cause of the Sounds of Respiration,' by Dr. Spittal, was then read.

The object of this communication was to show, that the theory of Laennec, in regard to the cause of the respiratory sounds,—viz. that all those known by the terms vesicular, bronchial, tracheal, as well as cavernous and amphoric respiratory murmurs, are caused by the friction of the air against the parietes of the air cells, bronchial tubes, trachea, and of cavities of different dimensions, has never been proved; and that the few experiments which have been advanced in support of it, are far from establishing the conclusions which have been deduced from them; and that it is highly probable that, according to the theory of M. Beau,\* these sounds, either owe their existence to, or are in part produced or modified by, the transmission or reverberation of a sound which takes place in the superior respiratory passages, and which has been termed, by M. Beau, the "guttural" respiratory sound. In support of the first theory, it was observed, that the best and almost the only experiment was that of Magendie, in which air was blown into the lungs by means of a pair of bellows, and in which sounds, resembling the respiratory murmur, were perceived, and from which M. Magendie drew the conclusion, that because air passed to and from the lungs during this experiment, as well as during respiration, therefore, the respiratory sounds are produced by the friction of the air against the parietes of the bronchial tubes and air cells of the lungs. It was stated that the similarity between the sound produced by a pair of bellows, and the guttural sound, was admitted by Laennec; and that it was also observed that a similar sound could be produced by blowing air through almost any tube; differing in tone and degree, according to the diameter or shape of the opening in the tube—the force with which the air is made to issue from it—or the nature of the materials of which it is composed. The experiments of M. Beau, in support of his particular theory, it was noticed, were open to objections, and did not seem to bear out very clearly the conclusions at which he arrives; which may perhaps account for the neglect his view of the subject has met with. For the purpose of obviating these, and showing in a more distinct manner the probable truth of this theory, to a certain extent at least, several experiments were devised, calculated to prove this in a less objectionable manner. In these experiments no stream of air was allowed to pass through those parts the subject of observation, which were only allowed to become, and remain distended, with air; while, at the same time, the sound produced by the issuing of the air from an air-condensing apparatus, or from the mouth,—and which very nearly re-

\* Archives Générales, Paris, 1834.



sembled that of the bellows, which again resembles the guttural sound,—was observed to have passed freely, in one experiment, throughout an artery of eighteen inches in length, and to be perceived very nearly, if not quite, as loud in this as in another artery connected with it, and through which a current of air passed. In another experiment, in which the lungs of a lamb were used, sounds analogous to the tracheal, bronchial, and vesicular, respiratory murmurs were distinctly perceived, although no current of air passed along the air tubes or cells; and in the case of a bladder, attached to one of the great bifurcations of the trachea, a sound louder than that in the bronchial tubes was perceived, when the former was contracted to about an inch and a half or two inches in diameter; feebler when larger; and assuming, as its size was increased, a gentle, shrill, ringing, amphoric character. In these different observations, no current of air passed along the parts the subject of examination, but was conveyed away in a manner which our space will not permit us to describe. These experiments were not advanced to prove that the guttural sound, or that which takes place in the superior respiratory passages, is the only source of the respiratory murmurs; but to show that in all probability it exerts a considerable influence, if not in producing, at least in modifying, the different respiratory sounds, known as the vesicular, bronchial, tracheal, cavernous, and amphoric respiratory murmurs, all of which have hitherto been explained according to the views of Laennec.

## SATURDAY.

The Section met at half-past 10 o'clock, to hear some papers, which could not be brought forward for want of time at the former sittings.

Mr. Crawford read a paper 'On Anthracosis, occurring in an individual who had worked in a lead mine.'

A conversation ensued as to the prevalence of this disease in the coal mines around Newcastle. The opinions seemed contradictory on the subject.

'On the medicinal and poisonous properties of some of the Iodides,' by Dr. A. T. Thomson.

The principal preparation whose action was detailed was the iodide of arsenic. Different modes of preparation were pointed out, its characters described, and specimens of the preparation handed round. The action of this medicine in very minute doses, from  $\frac{1}{4}$  to  $\frac{1}{2}$  of a grain, was peculiarly serviceable in lepra vulgaris, and chronic impetigo. A case of numerous tumours resembling carcinoma was found to yield to its continued action, and it was found equally successful in a more decided case of incipient carcinoma. Its action as a poison when given in overdose was minutely detailed in a series of experiments on dogs; its action being very similar to that of arsenious acid. Coloured drawings of the morbid effects on the alimentary canal were exhibited; when injected into a vein, its effect was to destroy life by destroying the irritability of the heart.

Doctor Adams read a paper 'On the Placental Souffle,' detailing some remarkable stethoscopic phenomena occasionally heard in connexion with it.

## SECTION F.—STATISTICS.—FRIDAY.

The first paper read, was 'Statistical Notices from the Parish of Billingham,' by Mr. W. R. Charlton.

This parish is situated in the west of the county of Northumberland, and possesses very few coal or metalliferous works, and none of any great extent. In 1831, the declared annual value of the parish was 6,435*l.*, and the population 1460 persons. Previous to March 1836, the annual expenditure on the poor was 681*l.*; but since it has been brought under the operation of the new Poor Law, that sum has been reduced to 603*l.* without any hardship to the really deserving poor. The number of acres in the parish is 18,000; of farms, 77, let from year to year, varying in size from 800 to 20 acres. The soil generally light; the subsoil partly clay and partly sand; the drainage is bad, but beginning to be improved; 1582 acres are under the plough, 1400 meadow land, and 2200 are pasturage; the number of horses employed for agricultural purposes is 119. The usual rate of labour is 2*s.* 6*d.* in summer, and 2*s.* in winter, for common labourers. A male farm-

servant or hind is usually hired by the year, and receives from 12*s.* to 13*s.* per week, with a house rent free. The bondage system, so usual in the northern and eastern parts of Northumberland, is unknown in this parish. The average condition of the hinds and labourers is, on the whole, satisfactory; and pauperism is manifestly on the decrease. Mendicity, vagrancy, and crime, have been greatly diminished since the formation of a kind of rural police, by an association formed originally for the protection of game, but which has extended its care to the protection of persons and property. Education is above the average in rural districts, there being few among the younger part of the male population who cannot read and write; but among the females, the latter qualification is more rare than the former. Though the inhabitants of the valley of the North Tyne possessed, some three centuries ago, a notoriously bad character, and not undeservedly, there is not at present a more peaceful population in Great Britain. The decennial returns of the population show a great variation in the rate of increase, which was not explained:—

Population in 1811 .....	1232
— 1821 .....	1396
— 1831 .....	1460

Mr. Hare, President of the Leeds Statistical Society, made some prefatory remarks on 'An Outline of Subjects for Statistical Inquiries,' in which he observed how much the importance and value of these societies would be augmented by a strict attention, so far as is practicable, to uniformity in the designs they have in view, by a general agreement in reference to the principles on which they are based, the terms and numerals employed in their investigations, and the documents used in their elucidation. With a view to the attainment of these desirable objects, Mr. Hare sketched an outline of the subjects of inquiry, comprising a series of tables, intended to be filled up by the different societies; these subjects, though necessarily complex, are classified in the following manner: they consist of—

1. Physical Statistics, relating to Topography.
2. Vital ——— the Physical Condition of Man.
3. Mental ——— the Intellectual and Moral Being of Man.
4. Economic ——— the Social Condition of Man.
5. Miscellaneous.

Under the first head are embraced, Topography, Geology, Meteorology.

Second—Births, Marriages, Deaths, Population, and Medical Statistics.

Third—Education, Adult Instruction, Ecclesiastical Institutions, and Commercial Statistics.

Fourth—Real and Personal Property, Manufactures, Trade, Commerce, Agriculture, &c.

Fifth—Various subjects, not comprehended in the foregoing.

From the above tables, of which there are upwards of 120, each town, where a society is established, may select the appropriate number and description of papers, which its peculiar locality may require.

The third paper read was the 'Statistics of Ramebottom, near Bury, in Lancashire,' by P. M'Dowall. It consisted of the following tables:—

HOUSES.					
No. of Cottages.	With good Furniture.	With one different.	With one bed-room.	With two bed-rooms.	
309.	294.	15.	137.	172.	
Table of Families with one bed-room.					
Families.	Persons.	Ditto, with two bed-rooms.			
In 9 .....	2	14 .....	3		
14 .....	3	15 .....	4		
21 .....	4	24 .....	5		
24 .....	5	25 .....	6		
25 .....	6	16 .....	7		
24 .....	7	25 .....	8		
5 .....	8	17 .....	9		
5 .....	9	11 .....	10		
4 .....	10	6 .....	11		
3 .....	11	4 .....	12		
2 .....	12	4 .....	13		
1 .....	13	7 .....	14		
137		172			

FAMILIES.					
Males.	Females.	Total.	Unmarried.	Not any Children.	No. of Widows.
968.	1032.	2000.	265.	5.	24.
Families with no married Couple.					
9.	Ditto with two in each.	91.	Male.	Lodgers.	Female.
			50.	33.	63.

AGES.		
Above 50 .....	91	Above 70 .....
60 .....	26	80 .....
Number receiving wages .....		
1134.		

TABLE OF THE WAGES.			
Families.	No. receiving Wages.	To support Persons.	
13 .....	All .....	65	
51 .....	1 .....	200	
50 .....	2 .....	248	
45 .....	3 .....	257	
41 .....	4 .....	286	
42 .....	5 .....	313	
30 .....	6 .....	206	
14 .....	7 .....	157	
7 .....	8 .....	73	
5 .....	9 .....	64	
3 .....	10 .....	38	
8 .....	not known .....	39	
309		2090	

Number who can read, 1319; total who can write, 531.

Some of the facts in this paper excited much attention; for example, 137 families have, it appears, only one bed-room each; and yet there are five, six, seven, and up to thirteen persons in some of these families.

Colonel Sykes read a very elaborate report on the 'Statistics of Cadiz,' [see *ante*, p. 604.] which the Section resolved to recommend to the Committee for publication. It would be impossible to give any abstract of a paper, whose importance arose chiefly from the minuteness of its details; and we shall therefore confine ourselves to the general results. Cadiz is a well-built and densely-populated city; large provision is made for gratuitous instruction, and yet only 24  $\frac{1}{10}$  per cent. of the children are educated, —a fact which seems to prove that the mere provision of means is not sufficient for educating a nation; this average being far below the lowest average in England. Crime, on the other hand, presents a more favourable aspect, the annual number of criminals being only 1 in 72. The wages of labour are 50 per cent. lower than in this country, though bread and meat are much dearer. It is therefore very difficult to account for the low ratio of crime, especially as the police of Cadiz, ever since the Revolution, is remarkable for its vigilance and activity. The commercial statistics were limited to the import of colonial produce, and the export of sherry from Xeres. The enormous extent of smuggling in Spain renders it impossible to give any accurate statement of foreign trade. The average annual export of sherry is 28,627 butts, each containing 600 bottles; and as this is less than the amount professedly imported into England alone, it follows that some other article must be substituted for sherry by the wine merchants. The charitable institutions of Cadiz are admirably conducted; they are supported partly by endowment and partly by voluntary contributions; no compulsory rate for the support of the poor being levied in the city. Relief is no longer afforded by the convents, which have been all secularized.

Mr. Kingsley read a paper giving a tabulated view of the 'Criminal Statistics of Ireland.' It should be premised, that these tables are collected from the Prison Reports for 1836. The Counties are separated from the Cities, as the crimes of the latter are of a different character from those committed by a dispersed population, which is not under the more immediate surveillance of a police. In Armagh and Monaghan, for instance, where the population of each county approximates to that of the city of Dublin, offences without violence to property are only 177, while in the latter they amount to 2128. The counties and the cities are arranged in the order of their respective population; the number of souls on each square mile of superficial extent of each county is also inserted. Statistical reliance cannot be placed on this latter, as the calculation, Mr. Kingsley observed, must be based on the acres which were taken from an old almanac. A comparative standard for crime (column C) will be found useful to those who enter deeply into such subjects. Carlow, the least populous county, being rated at one soul: if eight crimes be committed in Cork, both counties may be pronounced as in the same state: the same standard may be referred to the cities, Carrickfergus and Dublin being as 1 to 23, decimals being rejected. Some disturbing influences are involved in arriving at accurate results in the Grand Jury Cities: the jurisdiction of Cork extends some miles beyond that city, by which a portion of the crimes of a rural population is unavoidably included in its return. Carrickfergus would seem to enjoy perfect happiness, being without crime; however, its prison is merged in that of Antrim, the county to which it belongs.

Statistical References.	Population Census, 1881. G. M. Fourras, Whitehall.	Number of Souls to the Square Mile, Enghish.	Comparative Standard: Carlow, least populous County, rated as one Crime.	Counties in the order of Popu- lation.	Offences against the Person.	Offences against Property, with Violence.	Offences against Property, with- out Violence.	Offences (Malicious) against Pro- perty.	Offences and Forgery against the Currency.	Offences not included in the foregoing.	Totals of all Offences.	Deaths.	Free Pardon.	Executed.
0	A	B	C	D	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	E	F	G	H
1	705,926	265	8,653	Cork .....	394	47	272	14	5	307	1,199	..	..	..
2	402,598	137	4,935	Tipperary .....	622	44	265	63	5	558	1,557	22	4	5
3	394,207	103	4,833	Galway .....	165	39	88	21	12	40	355	10	..	..
4	367,936	172	4,310	Mayo .....	453	7	91	..	12	292	1,155	4	2	..
5	352,571	161	4,392	Down .....	183	6	121	..	7	129	460	6	14	1
6	314,608	286	3,856	Antrim .....	126	6	275	..	8	148	563	4	..	..
7	302,943	214	3,713	Tyrone .....	146	7	35	..	4	148	340	5	17	..
8	298,104	250	3,654	Donegal .....	179	21	47	13	1	177	438	..	1	..
9	264,559	327	3,243	Kerry .....	250	15	144	1	4	333	747	9	2	1
10	258,262	236	3,165	Clare .....	223	20	84	13	10	39	389	5	6	..
11	239,903	309	2,942	Roscommon .....	286	4	60	4	4	79	437	8	4	..
12	233,505	273	2,862	Limerick .....	333	13	82	20	5	350	803	4	2	..
13	228,050	211	2,795	Cavan .....	92	12	65	4	2	28	293	..	..	..
14	222,416	213	2,736	Londonderry .....	149	8	69	14	11	112	363	..	..	..
15	220,651	275	2,704	Armagh .....	164	2	114	..	4	279	563	2	44	..
16	195,532	155	2,306	Monaghan .....	158	27	63	50	2	60	360	..	1	..
17	183,042	298	2,243	Dublin .....	141	46	335	1	6	311	839	..	..	..
18	182,991	222	2,243	Wexford .....	127	3	77	7	5	319	538	1	8	..
19	177,023	208	2,170	Meath .....	85	28	107	4	4	105	333	6	19	..
20	171,508	201	2,102	Sligo .....	245	34	112	12	6	110	519	3	..	..
21	169,283	222	2,075	Kilkenny .....	136	7	107	7	3	222	480	2	..	..
22	149,555	218	1,883	Fermanagh .....	98	9	59	4	3	165	328	1	..	..
23	148,077	274	1,815	Waterford .....	122	9	127	27	..	62	347	8	..	4
24	145,843	180	1,788	Queen's County ..	297	26	71	11	3	328	736	2	1	..
25	144,029	245	1,765	King's County .....	285	16	127	28	10	300	766	11	..	2
26	141,303	233	1,732	Leitrim .....	124	7	35	9	1	151	327	..	..	..
27	136,799	480	1,676	Westmeath .....	282	43	164	22	7	243	761	5	32	1
28	122,301	430	1,459	Wicklow .....	76	..	140	..	..	216	1	..	..	1
29	112,391	509	1,377	Longford .....	174	33	35	12	6	347	607	4	1	..
30	108,401	235	1,328	Kildare .....	169	43	170	9	4	242	637	15	..	..
31	108,168	231	1,325	Louth .....	140	2	43	..	2	125	321	1	..	..
32	81,576	386	1,000	Carlow .....	203	18	101	19	5	132	858	2	..	..
324	7,995,333			Totals .....	6,636	592	3,693	393	160	7,019	18,485	142	178	15
33	203,652		2,3413	Grand Jury Cities.	410	18	3,128	..	31	40	2,627	19	2	..
34	107,041		1,2306	Dublin .....	167	20	365	36	10	262	860	4	2	..
35	66,575		7,646	Cork .....	285	30	233	31	9	684	1,272	6	1	..
36	33,120		3,807	Limerick .....	92	..	20	14	1	15	142	1	..	..
37	28,821		3,313	Galway .....	82	6	58	10	2	33	191	..	6	..
38	23,741		2,729	Waterford .....	55	4	59	6	1	77	202	..	1	..
39	17,365		1,996	Kilkenny .....	42	1	45	10	..	14	112	3	..	..
40	8,698		1,000	Drogheda .....	..	..	..	..	..	..	..	..	..	..
				Carrickfergus .....	..	..	..	..	..	..	..	..	..	..
41	489,013			Total Grand Jury Cities ..	1,133	79	2,908	107	54	1,125	5,406	33	12	..
42	7,784,536			Total Counties and Cities ..	7,769	671	6,593	500	214	7,144	23,891	175	190	15

## SECTION G.—MECHANICAL SCIENCE.—SATURDAY.

'On Riveting Boiler Plates by Machinery,' by W. Fairbairne.

Mr. Fairbairne described the machinery which he had invented for making boilers. By this machine, two men and two boys can fix eight rivets three-quarter inch diameter per minute, or nearly 500 per hour, whereas, by the ordinary operation, with an additional man, not more than forty can be inserted; thus, the advantage is as about 120 to one, besides the saving of one man. By this machine an ordinary locomotive boiler, ten feet six inches by one foot diameter, can be riveted, and the plates fitted in four hours; whereas the time required, besides extra hands, without this machine, would be twenty hours. The work is also much superior. The rivets being hot, the holes are completely filled, and the rivet by its contraction draws the plates so closely together, that the joints are perfect. On testing a high pressure boiler made by this machine, to 200lb. on the square inch, there was no leakage; but in a boiler made by hand, very many of the rivets would be found to leak.

'On the Construction of Timber Viaducts,' by B. Green.

The timber viaducts constructed by Mr. Green, on several lines of railway, consist of arches on stone piers. These arches consist of three ribs, and every rib is put together with three-inch deck deals, in length of from twenty to forty-five feet, and two of the deals in width. The first course is composed of two whole deals in width, and the next of one whole and two half deals, and so on alternately until the rib is formed. Each rib consists of sixteen deals in

height or thickness, their ends making joints, so that no two of the horizontal or radiating joints shall come together. The three ribs are connected together by diagonal braces and iron bolts; the spandrels are strutted in a peculiar manner; the whole of the timber was subjected to Kyan's process, and between every deal is a layer of brown paper dipped in tar. The same principle of constructing arches of iron by laminated plates, has been adopted by Mr. Green. Wrought iron bars from one and a half to four inches square (according to the span of the arch), from fifteen to twenty-five feet long, grooved on the under, and tongued on the upper side, are laid one over the other and bent over a centre, until the rib is formed. The iron bars are bound together at intervals of from four to six feet apart, with iron straps and keys round the rib. The spandrels are fitted with iron struts. A considerable saving of expense and great lightness, as compared with stone or ordinary iron bridges, may thus be attained.

'On an Improved Method of working the Valves of a Locomotive Engine.'

Professor Willis described the method recently introduced by Mr. Hawthorn, for working the valves of a locomotive without the usual eccentrics. The motion is derived at once from the connecting rod, by means of a pin placed at the centre of the connecting rod, and giving to a frame a reciprocating motion in a vertical direction, at every revolution of the crank. To this frame are attached arms, by which motion is communicated to the slides. It is necessary that the slide should be open for the admission of the steam into the cylinder, a little before the piston has completed the stroke; this, which is technically

termed the *lead* of the slide, must be provided for with great care, so as to correspond with the various speeds of the piston; this arrangement cannot be made where eccentrics are used without considerable difficulty, but this is provided for in Mr. Hawthorn's method, by simply changing the angle at which the frame is set—an operation which can be performed by adjusting a screw.

'On Methods of Filtering Water,' by J. T. Hawkins.

In this paper the author detailed the various essentials for a durable and simple filter for obtaining pure water. The charcoal must be perfectly well burnt, and kept from exposure to the atmosphere; a test of good charcoal is, that when pulverized, it sinks rapidly in water. The charcoal must be supported on an indestructible material, as a plate of burnt clay perforated with holes. The filter may consist of a common gardenpot, or similar vessel with holes at the bottom. The lower part may be filled with round pebbles, then some smaller pebbles, then some coarse sand, and finally a stratum of pounded charcoal, of about three or four inches in thickness. It is a great mistake to put any material, as sand, above the charcoal, with the view of arresting the grosser particles of impurity, as the sand will quickly stop up and be impervious to water. A filter thus prepared will render water perfectly clear and sweet for many years.

'On the Effect of Sea and River Water on Iron,' by Mr. R. Mallet.

Mr. Mallet stated, that he and Prof. E. Davy had, at the request of the Chemical Section, been associated in a series of experiments on the action of sea and river water on iron. They had come to results of great importance to the civil engineer, some of which he would mention. They found that pure oxygen and pure water are both neutral bodies in regard to iron, and only act on it together; that the larger the quantity of uncombined or suspended carbon in cast iron, the more is it acted on by these agents, so much so, that soft Scotch or Irish cast iron may be used to protect grey or chilled cast iron from all corrosion. With respect to the protection of iron by electro-chemical agency, zinc will only protect iron for a time; the oxide of zinc becomes transferred to the surface of the iron, when all protection is at an end. Brass, as proposed by Mr. Hartley, will not protect iron, and he showed some specimens brought from the Liverpool Docks, in which the corrosion had clearly been promoted by the adoption of this method. Other very important results on this subject are detailed in the report to the Chemical Section. [See ante, p. 630.]

'On Steam Navigation,' by Mr. J. S. Russell.

Mr. Russell resumed the above subject, the continuation and discussion of which had been adjourned from Thursday. He recalled attention to the following points—that, by doubling the three dimensions of the vessel, eight times the space, at an expense of only double the power, might be obtained—that the form of the vessel must be especially attended to—and that the objections on account of sharpness, which were applicable to sailing vessels, do not apply to steam vessels. He insisted on the propriety of making steamers sharp. Nautical men had great objections to extremely sharp vessels, and preferred full bows. He did not wish to do away with the fulness, but to leave the fulness in its proper part, and add a sharp prow to full bows. By this means, great advantages might be obtained in the proper stowage of the cargo, and proportioning of the load. Breadth and fulness in the centre are absolutely indispensable, and this can only be obtained by lengthening out the extremities. Mr. Russell next proceeded to the subject of power, especially with reference to that of the boilers, which depends on the surface. The points especially to be attended to are, extent of surface, thickness and quality of material, and modes of strengthening. Iron boilers, with copper tubes, possessed considerable advantages; the form of boilers is of little consequence, provided extent of surface be obtained.

The President announced, that the time having expired, this Section must adjourn; and the Secretary read the following titles of communications received:—Mr. Reed 'On an improved Safety Hook and Bow for Coal Pits.' Mr. Glynn 'On the Waterworks of Newcastle.' Mr. Wake 'On a new Paddle Wheel.' Sir Charles Monteith, Bart. 'On a new Tram-road;

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also, 'On an improved Kitchen Grate.' Mr. Four-  
new 'On Coal Mine Ventilation.' Mr. Dobson 'On  
a method of making Bricks of every required colour.'

## OUR WEEKLY GOSSIP.

THE publishers' lists contain but few announce-  
ments calculated to quicken expectation. Mr.  
Frazer promises three works on the Pyramids of  
Gizeh—one an illustrated account, by Col. Howard  
Vyse, of the operations carried on there in 1837;  
another, a description "from actual survey and  
measurement," by Mr. Perring; and a subsidiary  
work on the Hieroglyphics on the Coffin of Myce-  
rinus. There are also announced, a novel by Mrs.  
Gore, and Mr. Stephens's 'Incidents of Travel in  
the Russian and Turkish Empires.' Truly this is  
Lenten, not Michaelmas fare.

From the Continent, little has arrived in the last few  
days, beside details of the coronation at Milan—a cere-  
monial which has been arranged with a fantastic gor-  
geousness absolutely bewildering in these Utilitarian  
days. One *homage* prepared for the imperial pro-  
gress—we mean, the Emperor's being met, on the  
Lake of Como, by Pasta, who came out to receive  
him, singing in her boat—reminds us of the pageant  
at Kenilworth, and "the Lady of the Lake" who  
paid her duty to the virgin queen in the same pic-  
turesque fashion. But in interest, far beyond this  
tale of nobles and heralds in cloth-of-gold,—of streets  
walled with brocade and tapestry,—is the amnesty  
which the Emperor has issued for all political  
offences, and which seems to be full, generous, and  
worthy the occasion of which it is the true crowning  
glory. The only further tidings from Italy are those,  
concerning rather the *Gazette des Tribunaux* than  
ourselves, of the Corsican bandit Ciccio ("the owl"),  
who the other day assassinated a priest while the latter  
was saying mass: and the last act of the Neapolitan  
censorship—its suppression of 'Polyeucte,' the new  
opera by Donizetti, which has been prepared for  
Nourrit, who is now at San Carlos. The work, there-  
fore, may possibly be brought forward during the  
coming season at Paris. From Switzerland, we hear  
that a Mdlle. Dangeville reached the summit of  
Mont Blanc on the 4th of this month, with far less  
suffering than was experienced by her one female  
predecessor—a peasant of Chamouni—who became  
so entirely prostrated by fatigue, when the ascent was  
all but accomplished, that it was necessary for her to  
be carried to the summit by her companions.

From the accounts we have seen of 'Benvenuto  
Cellini'—the new opera just produced at the *Acadé-  
mie Royale*, Paris—it does not appear as if its  
reception justifies the high hopes entertained of M.  
Berlioz by some of his friends. Since, however, the  
composer has always paraded himself as the chief of  
the hyper-romantic school, and thus rendered him-  
self the subject of outrageous attack, no less than of  
extravagant praise, it is, in his case, more than  
usually unsafe to put trust in the *feuilletons*. In all  
the music by M. Berlioz, which we have heard, he  
has seemed to us to struggle after grandeur, and  
depth, and originality, in place of reaching them by  
the one bold but certain step of genius. On the pre-  
sent occasion, he is upbraided with being *baroque*,  
extravagant, and unintelligible, in his anxiety to pro-  
duce the sterner and more antique effects of music.  
Some blame, however, may be laid on the *libretto*,  
in two acts, furnished by MM. Wailly and Barbier,  
which appears calculated to check rather than to  
encourage the inspirations of a composer. The work  
was carefully executed, Duprez taking the part of the  
fiery sculptor: the costumes and scenery, of course,  
splendid and correct.

As the National Gallery closes to-day, we must  
content ourselves with merely announcing the re-  
cent addition to its treasures, made by the Duke of  
Northumberland. This consists of three pictures,—  
'A Capuchin Friar,' by Rembrandt; a 'Holy  
Family,' by Jacob Jordaens; and 'The Plague of  
Ashdod,' by Nicholas Poussin.

The "statue warfare" still goes on. Being bound  
to record proceedings, we cannot but advert to Lord  
Londonderry's *column* on the subject, put forth a few  
days since, in the *Morning Post*. The Marquis is,  
of course, on the side of Mr. Wyatt; and the editor,  
in recommending his letter to attention, seriously  
winds up his paragraph by a mysterious hint, "that  
there is a something of Whiggery (!) in the whole

proceeding"—in the opposition to impudence and  
barrefaced jobbery. If this could be proved, we should,  
for the rest of our lives, think the better of the Whigs.  
To amend our notice of last week, we may copy,  
from the *Manchester Guardian*, a description of Sir  
Francis Chantrey's statue of Dr. DALTON, which, it  
appears, is completed, and now exhibiting at the  
Royal Institution. It is of white marble, remarkably  
clear from blemish. The proportions are colossal;  
the venerable philosopher is represented as seated in  
his study chair, in his robe as a doctor of civil law;  
and his usual posture has been preserved with con-  
siderable skill, taste, and good effect. His right elbow  
rests on the chair; three of the fingers support the  
chin, and the fore finger extends upwards towards the  
ear. His left arm is upon that of the chair, and the  
hand rests upon the upper edges of a volume, which  
is supported by the seat. His left leg is crossed over  
the right knee, and the left foot, which would other-  
wise be unsupported, rests upon a crucible, in which  
is a retort; and upon the ground beside them is lying  
a scroll, inscribed with some of the symbols used by  
the Doctor in denoting the atomic composition of  
bodies. In a shield at the back of the chair is en-  
graved "John Dalton, D.C.L." and on one side,  
"Francis Chantrey, sculptor, 1837."

The recent death of Mrs. Charles Kemble is not  
to be passed over without a word of notice and regret.  
It is now many years since her archness and vivacity  
made her, when Miss De Camp, a favourite on the  
English stage—her *Morgiana*, in the 'Forty Thieves,'  
being, perhaps, her most popular character. Her last  
appearance at Covent Garden, after some years  
of retirement, was, if we mistake not, to support her  
eldest daughter (now Mrs. Butler) on the occasion of  
her *début*.

We cannot take leave of the British Association  
without a grateful acknowledgment of the kind  
assistance received from all who had it in their power  
to serve us: and, indeed, few persons, except those  
present at the meeting, can imagine the urgent de-  
mands on the time of all during that exciting week,  
or properly estimate the sacrifices made by many  
distinguished men to enable us to perfect our Report.  
Though different readers may set a different value  
on that report, none can complain that it has occu-  
pied space to the exclusion of other matters: the  
season, fortunately, leaves us more room than usual  
at command; and the omission, in a great degree, of  
advertisements, and the issuing of four double num-  
bers, have enabled us to do full justice to the philo-  
sophers, and yet keep up with the progress of publi-  
cation. As it is not always wise to hide one's light  
under a bushel, we may be excused for observing  
that our report occupies 200 columns, and is, there-  
fore, equal in extent to two common octavo volumes,  
of 400 pages each, and of 22 lines to the page: yet  
the four numbers in which it is contained—we say  
nothing of the reviews and other matters in the same  
papers—are sold to the public for 1s. 4d.—a fact,  
not without important consequences to those who  
look deeper than the surface, and beyond the ques-  
tion, as it happens to affect individuals.

## DIORAMA, REGENT'S PARK.

This Establishment will be CLOSED for the Season on  
SATURDAY, the 9th instant, arrangements having been made  
for sending the two Pictures now exhibiting abroad. They  
represent TIVOLI, with a View of the Cascades, and the Interior  
of the BASILICA of ST. PAUL, before and after its destruction  
by fire. Painted by Le Chevalier Bouton. Open from 10 till 5.

POLYTECHNIC INSTITUTION, 300, REGENT-STREET,  
Incorporated by Royal Charter.

This most interesting Exhibition, combining instruction with  
amusement, contains a Canal into which a Diving-bell descends  
daily with four or five persons to a considerable depth, and a  
diver exhibits the method of working under water.—Also will  
be seen Glass Working, Printing Presses, Optical Glass Grinding,  
Steam Engine, Power Looms, Ivory and Engine Turning,  
Wax-figure Making, Braid Machines, Cooking by Reflected  
Heat at 100 feet distance, Splendid Magnetic Experiments, Chemi-  
cal and Philosophical Lectures splendidly illustrated, Power-  
ful Microscope by Cary.—Models of the Portsmouth Block  
Making Machinery, &c. all in operation daily.—The Rooms  
contain upwards of 500 Models and Works of Art, and the spa-  
cious Laboratory is furnished with every possible convenience  
and apparatus of the most costly description.

Open daily from Ten to Six o'clock.—Admission, 1s.; Diving-  
bell Tickets, 1s. extra.

## MUSIC AND THE DRAMA

## ENGLISH OPERA HOUSE.

This Evening, THE DEVIL'S OPERA; with SELF-ACCUSA-  
TION; and THE HIGHLAND CATHERAN.  
On Monday, THE DEVIL'S OPERA; after which an original  
Extravaganza (in One Act) to be called ROUGE ET NOIR;  
and SELF-ACCUSATION.  
Tuesday, THE DEVIL'S OPERA; SELF-ACCUSATION; A  
MUSICAL MELANGE; and CRAMOND BRIG—(for the  
Benefit of Mr. Frazer).

The voice of Music is mute in the metropolis, and  
the Drama is in a dreamy state just now, for the win-  
ter houses are only waking from their summer  
siesta; and while the fine weather lasts the public will  
not be impatient of the continuance of their nap.  
The promised comedy by Sheridan Knowles makes  
us give an eye to the Haymarket bills; meanwhile,  
those who like a laugh may drop in there and learn  
all about 'Tom Noddy's Secret,' which, though not  
worth knowing, is well worth hearing, being amusingly  
told by Haynes Bayly. It is nothing more than  
this:—a founding that had been left in the care of  
Tom Noddy, a superannuated schoolmaster, turns out  
to be a girl instead of a boy, as was imagined; and  
the "foster-father," on coming to claim his "adopted  
son," finds instead of a strapping youth a charming  
girl, whom he pretty soon converts into his wife. The  
bewilderment of poor old Tom Noddy at the per-  
plexities which the discovery brings upon him is very  
ludicrously expressed in the grimaces of Strickland;  
Buckstone's disgust and amazement at being mis-  
taken for a girl in man's clothes are also irresistibly  
droll. Miss Taylor coquettes very archly with her  
"foster-father," and makes a very handsome young  
cavalier: indeed she appears more easy and un-  
affected in her male attire than in her proper cos-  
tume. Altogether it is a very pleasant and picturesque  
farce.—Wrench, too, is playing at the Haymarket;  
and his glib assurance and confident brow are not  
abated by the wrinkles of time. Mr. Lemon's last  
Lyceum lucubration, 'Self-Accusation,' is a conca-  
tenation of malversation and machination, suborna-  
tion and conflagration, ruination and starvation, irri-  
tation and assassination, dislocation and (for lack of  
amputation) mortification, implication and exculpation,  
expiation and congratulation; and, (to go on  
with our *attions*,) it excited sensation, and elicited  
approbation, instead of sibilation and damnation,  
though it only moved us to cachinnation.

## MISCELLANEA

Botanical Society, Sept. 7.—C. Johnson, Esq., V.P.,  
in the chair.—The Secretary read a paper from the  
Curator, being 'Observations on a New Principle of  
Fencing, constructed by Mr. Breese, formed accord-  
ing to the Laws of Vegetable Physiology.' It is, in  
fact, a natural living fence, and consists simply of  
growing and planting for the purpose trees, or shoots  
of the same species, or species of the same genus, and  
causing them to unite by means of the process of  
"grafting by approach or inarching." A trench being  
made around the ground intended to be inclosed,  
the young trees or shoots are then planted in two  
directions a foot from each other, one set, for example,  
pointing or sloping towards the north, the other set  
sloping towards the south; where they cross each  
other, the bark is removed on both stems, and  
the two stems are then tied together; in the course of  
a few weeks they unite, and a natural living fence is  
formed, acquiring additional strength every year by  
the deposition of new wood sent down from the  
upper portion of the shoot bearing leaves, &c. A  
paper was also read from the Curator, being observa-  
tions on a variety of *Polygonum aviculare* called *P.  
marinum* of Hudson, specimens of which were ex-  
hibited, collected in Kent.

Bog Earth.—A Monsieur Orguesson, a Swede by  
birth, and proprietor of immense portions of land  
in the neighbourhood of Helsingfors in Finland, has  
invented an apparatus, by means of which he renders  
bog earth as hard and compact as coal. In this  
state it easily takes fire, gives a pure and brilliant  
flame, and produces as much heat, if not more, than  
coal.

Erratum.—Dr. Reid requests us to correct an error in  
our report of his paper 'On the Quantity of Air required for  
Respiration.' "The expression," says Dr. Reid, "which  
I used respecting the influence of light was, 'that in  
recovering from the effect of various oppressive atmospheres,  
to which I was necessarily at times subjected in obtaining  
the various data I was anxious to procure, and some of  
which contained 10 per cent. of carbonic acid, I always  
recovered more quickly, and felt in a short time more  
thoroughly refreshed if I was exposed, not only to a fresh and  
free atmosphere, but also to a brilliant light.'" We are  
obliged to Dr. Reid for the correction and for the abstract of  
his paper, by which we shall benefit, should a second edition  
of that Number be required; and can only regret that he  
did not furnish it at the time to the gentleman who reported  
for us the proceedings of the Medical Section.

## ADVERTISEMENTS

## CIVIL ENGINEERING and MINING.

A CLASS for the Instruction of Young Men intended for the Profession of **CIVIL ENGINEERING** or **MINING**, will be OPENED in the FIRST WEEK of October next. The Courses will be given by Professors the Rev. T. G. Hall, H. Mosely, J. F. Daniel, John Phillips, and C. Wheatstone; and in Geometrical Drawing by Mr. J. Bradley. A Prospectus of the Course may be had at the Secretary's Office, King's College, London, H. J. ROSE, B.D., Principal, 26th August, 1838.

## KING'S COLLEGE, LONDON.—SENIOR

DEPARTMENT.—The following COURSES OF LECTURES and CLASSES of PRIVATE INSTRUCTION will RE-COMMENCE on and after Tuesday, the 2nd October next, viz.

CLASSICAL LITERATURE.—The Rev. R. W. Browne, M.A.  
MATHEMATICS.—The Rev. T. G. Hall, M.A.  
ENGLISH LITERATURE.—The Rev. Thomas Dale, M.A.  
NATURAL PHILOSOPHY and ASTRONOMY.—The Rev. H. Mosely, M.A.

## EXPERIMENTAL PHILOSOPHY.—Charles Wheatstone, Esq.

POLITICAL ECONOMY.—The Rev. Richard Jones, M.A. Cains College, Cambridge.

ZOOLOGY.—The Rev. John Phillips, Esq. F.R.S. and G.S.

CHEMISTRY.—J. F. Daniel, Esq. F.R.S.

BOTANY.—David Don, Esq. Lib. L.S.

HEBREW and RABBINICAL LITERATURE.—The Rev. M. S. Alexander.

ORIENTAL LANGUAGES.—Duncan Forbes, Esq.

FRENCH LANGUAGE and LITERATURE.—Isidore Brasseur, Esq.

GERMAN ditto.—Adolph Bernays, Philos. D.

ITALIAN ditto.—G. Rosetti, Esq. L.L.B.

SPANISH ditto.—J. M. de Alcalá, Esq. L.L.B.

THE MICHAELMAS CLASS will commence on Monday, 1st October.

18th Sept. 1838. H. J. ROSE, B.D., Principal.

N.B. Chambers are provided for such Students in the Senior or Medical Department as are desirous of residing in the College.

## UNIVERSITY COLLEGE, LONDON.

FACULTY OF MEDICINE. Session 1838-39.

The WINTER TERM will commence on Monday, the 1st of October.

Courses in the order which the Lectures are delivered during the day.

BOTANY.—Professor Lindley, Ph. D.

MIDWIFERY, and DISEASES of WOMEN and CHILDREN.—Professor

ANATOMY.—Professor Quain.

ANATOMY and PHYSIOLOGY.—Professor Sharpey, M.D.

CHEMISTRY.—Professor Graham.

PRACTICAL CHEMISTRY.—Professor Graham.

COMPARATIVE ANATOMY.—Professor Grant, M.D.

MATERIA MEDICA and THERAPEUTICS.—Professor Thomson, M.D.

SURGERY, PRINCIPLES and PRACTICE of.—Prof. Cooper.

MEDICINE, PRINCIPLES and PRACTICE of.—Professor Elliotson, M.D.

PROSPECTUS and further particulars may be obtained at the Office of the College.

R. QUAIN, Dean of the Faculty.

The Lectures in the Classes of the FACULTY of ARTS commence on the 15th October.—The JUNIOR SCHOOL OPENS on the 20th September.

1st August, 1838.

## UNIVERSITY COLLEGE, LONDON.

JUNIOR SCHOOL.

Head Masters.

THOMAS H. KEY, A.M. Prof. of Latin in the College.

HENRY MALDEN, A.M. Prof. of Greek in the College.

The SCHOOL will OPEN on Tuesday, the 20th of September.

The Session is divided into three terms—viz. from the 25th of September to Christmas, from Christmas to Easter, and from Easter to the 3rd of August.

The yearly payment for each Pupil is 12*l.*, of which 4*l.* are paid in advance each term.

Three hours of attendance are from a quarter-past Nine to half-past Twelve on the first five days of the week, and to a quarter-past Twelve on Saturdays.

The subjects taught (without extra charge) are Reading, Writing; the properties of the most familiar objects, natural and artificial; the English, Latin, Greek, French, and German Languages; Ancient and Modern History; Geography, both Physical and Political; Arithmetic and Book-keeping; the Elements of Mathematics and Natural Philosophy; and Drawing.

Any Pupil may omit Greek and Latin, or Greek only, or devote his whole attention to the other branches of education.

There is a general Examination of the Pupils at the end of each Session, and the prizes are then given. The discipline of the school is maintained without corporal punishment.

A monthly report of the conduct of each Pupil is sent to his Parent or Guardian.

Further particulars may be obtained at the Office of the College.

21st August, 1838. CHARLES C. ATKINSON, Sec.

N.B.—Mr. Wright, 36, Tonbridge-place, Mr. Hardy, 32, Montagu-street, Hampstead-road, Mr. Haselwood, 30, Upper Gower-street, and Mr. Behan, 16, Easton-square, receive Boards.

The Lectures in the Classes of the FACULTY of MEDICINE commence on the 1st of October, those of the FACULTY of ARTS on the 15th of October.

## UNIVERSITY COLLEGE, LONDON.

JUNIOR SCHOOL.

Mr. HASSELWOOD, Private Tutor and Assistant Master at the University College School, College-street, under the supervision of the Head Master, SELECT NUMBER of YOUNG GENTLEMEN as Boarders, to be educated in the School of the College.

Terms for Board and Private Tuition 45 Guineas per annum. Each Pupil has a separate bed. The number being limited, a term's notice is required prior to removal. The house adjoins the play ground of the College, to which (with permission of the Council) a communication has been opened for the Pupils' recreation.

Further particulars may be obtained by letter (post paid) addressed to Mr. Haselwood, 30, Upper Gower-street, Bedford-square.

## ENVELOPES 2s. 3d. per hundred, or 21s. per 1000;

Envelopes black bordered, for mourning, 6*l.* per hundred, or 6*l.* per 1000, warranted of the best paper—an extensive and elegant assortment of Envelope Cases, filled with Envelopes, from 6*l.* to 6*l.* 6*l.*—Name-plate elegantly engraved, and 100 of super-fine cards printed, for 5*l.* 6*l.*—Blotting-books at 1*l.* 6*l.* ditto, with locks, 4*l.* 6*l.* The most choice Selection of Bibles and Prayer books in London. The whole of the above articles 20 per cent. under any house in London.—To be had at STOCKEN'S, 33, Quadrant, Regent-street.—Country orders punctually attended to.

## A STUDENT of Christ Church, B.A., not with-

out distinction in the Class List, who was educated at a Public School on the Etonian Plan, is desirous to enter a Family of Consideration, as PRIVATE TUTOR, at Christmas next. He is peculiarly qualified to prepare boys for any of the great public schools.—References of the highest character, as to moral and religious principles and literary qualifications, can be given. Address A. B., Post-office, Plymouth.

## TO MINERAL PROPRIETORS, IN COAL AND IRON-

STONE.

## AN opportunity now offers of receiving a YOUNG

MAN wishing to learn practically the ART of MINING and MANUFACTURING IRON, together with the CIVIL ENGINEERING, and Mechanical Departments necessary for such Establishments, with whom a liberal premium will be expected.

For particulars, all letters (post paid) addressed to I. C. M., Post Office, Leeds, will be duly attended to.

## GUYS' HOSPITAL.

The AUTUMNAL COURSE OF LECTURES will commence on MONDAY, 1st OCTOBER.

Theory and Practice of Medicine.—Dr. Bright and Dr. Addison.

Materia Medica and Therapeutics.—Dr. Addison.

Anatomy and Physiology.—Mr. Brassey Cooper and Mr. E. Cock.

Anatomy, Physiology, and Diseases of the Eye.—Mr. T. Bell.

Descriptive and Anatomical.—Mr. E. Cock and Mr. Hilton.

Principles and Practice of Surgery.—Mr. Key and Mr. Morgan.

Midwifery and Diseases of Women and Children.—Dr. Ashwell.

Comparative Anatomy.—Mr. Key and Mr. Morgan.

Chemistry.—Mr. A. Aikin and Mr. A. Taylor.

Botany.—Mr. C. Johnson and Dr. G. Bird.

Medical Jurisprudence.—Mr. A. Taylor.

Experimental Philosophy.—Mr. G. Bird.

Moral Philosophy.—Rev. F. D. Maurice.

Clinical Lectures and Instructions will be given on Medical, Surgical, Ophthalmic, and Obstetric Cases.

Pupils will be permitted to attend the Eye Infirmary and the Obstetric Charity, and will also have the use of the Museum, Library, Reading Room, and Botanic Garden, subject to regulation.

For particulars apply to Mr. Stocker, Apothecary to the Hospital.

## TO PAINTERS IN WATER-COLOURS.

## ROBERSON &amp; MILLER'S PERMANENT

MOIST WATER-COLOURS, adapted equally for Sketching or Finished Drawings, of LOW PRICE.

Roberson & Miller beg leave to acquaint the Artist and Amateur in Water-Colours with their recent improvement, from their original invention in 1831, in the preparation of Moist Water-

Colours, whereby the brilliancy, clearness, and power, with transparency combined with facility in use, are perfected in so high a degree as to render further improvement uncalled for.

Roberson & Miller beg further to observe they are now employed by the first Artists in the United Kingdom and France, and the most flattering commendations are in their possession respecting the qualities of these Colours.

Copy of a Letter from J. D. H. RINDEN, Esq. to Messrs. ROBERSON & MILLER.

"Gentlemen.—I have now finished three pictures with your Improved Water-Colours, and I think I can safely venture to give you my opinion of them. They really are, as you style them, 'Improved Water-Colours,' for in purity and brightness they are greatly superior to any I have ever seen, and these are very essential qualities in Water-Colours invariably dry dull."

Prepared and sold by Roberson & Miller, at the Manufactory, 21, Long Acre, in single Cakes or in Boxes, with the Apparatus for Sketching from Nature, on improved principles for utility and compactness.

## METROPOLITAN LIFE ASSURANCE

SOCIETY.

The Directors hereby give Notice to Members whose Premiums fall due on the 5th of October next, that the same must be paid within Thirty days from that date.

The leading principle of the Society is to appropriate the whole of the profits (undiminished by Agency or Commission), by way of reduction in the premiums of Members of five years' standing.

The Premiums of Members, who are the only Proprietors of the Society, are payable yearly, quarterly, or quarterly on the 5th of January, the 5th of April, the 5th of July, and 5th of October; either of which several days constitutes the commencement of the Year to Members; Persons therefore, desirous of entering the Society as Members on the 5th of October next, should appear at the Office on or before that day.

RICH. HEATHFIELD, Superintendent.

Princes-street, Sept. 10, 1838.

## ATLAS ASSURANCE COMPANY,

Established 1808.

Directors.

Sir Thomas Tait, Bart., Chairman.

J. D. Home, Esq., Deputy Chairman.

The Hon. Sir Courtenay Boyle, Emanuel Peck, M.D.

John Oliver Hanson, Esq.

William George Prescott, Esq.

William Laforet, Esq.

John Peter Ranch, Esq.

Moses Mocatta, Esq.

James William Ogle, Esq.

JOHN WOOLLEY, Esq. Actuary.

CHARLES ANSELL, Esq. Actuary.

LIFE DEPARTMENT.—Persons assured for the whole term of Life in Great Britain or Ireland respectively, will have an ADDITION made to their Policies every seventh year, or an equivalent reduction will be made in the future payments of Premium, at the option of the Assured.

The third Septennial Valuation up to Christmas 1837, is now completed, and the Directors have great satisfaction in stating its result.

The following Table shows the total Additions made to Policies for 100*l.* effected in London, or through an Agent in Great Britain, which had been in force for the 21 Years ending 1837.

BONUS.

Equivalent to the following Per Centage on the Premiums paid to the Company.

Assurances for Short Periods may now be effected in this Office at considerably reduced Rates of Premium.

FIRE DEPARTMENT.—In addition to the benefit of the late Reduction in the Rates of Premiums, this Company offers to Assureds, who are desirous of the loss of Rent of Buildings rendered untenable by Fire.

The Company's Rates and Proposals may be had at the Office in London, or of any of the Agents in the Country, who are authorized to report on the application of Losses prepared for Assurances.

HENRY DESBOROUGH, Secretary.

92, Cheapside, 22nd Aug. 1838.

## TO THE HOLDERS OF POLICIES in the

EQUITABLE INSURANCE COMPANY ENTITLED to the BONUS, due 1st of January 1840, the United Kingdom Life Assurance Company affords the most convenient and moderate way of securing such Bonuses.

If a gentleman of 65, for instance, is entitled to a bonus of 1,000*l.*, and should die previous to 1840, when the bonus should be due, he may secure the same to his family by the payment of one-third of the half-yearly premium, at the rate of 4*l.* 11*l.* 7*l.* per cent. or 4*l.* 11*l.* 7*l.* per cent. the insured being secured credit for the other half, being the amount of premium unpaid.

A gentleman of 70, in like manner, may secure 1,000*l.*, at the half-yearly premium of 6*l.* per cent. being 60*l.* with this great advantage, that should he feel inclined to continue the insurance, he can do so, on the same terms, for five years, and afterwards for life, by paying the full premium annually, which will be exactly double the half-yearly, as stated, or the insurance may be allowed to expire when the bonus of the Equitable is safe; this Company having no claim for the half credit allowed, unless death should happen previous to the bonus being secured, when the amount of credit will be deducted from the sum insured.

Every information will be afforded on application to Edward Boyd, Esq., Resident Director, United Kingdom Life Assurance Office, 8, Waterloo-place, Pall Mall, London.

## SCOTTISH UNION FIRE and LIFE IN-

SURANCE COMPANY, No. 49, West Strand, and No. 74, King William-street, Mansion House, London; George-street, Edinburgh; and Glasgow.

Instituted 1824, and incorporated by Royal Charter.

Directors.

Charles Balfour, Esq.

John Deans Campbell, Esq.

William Fane De Salis, Esq.

J. Gordon Duff, Esq.

John Gooden, Esq.

John Kingston, Esq.

S. Mackenzie, Esq. Manager.

Walter Learmonth, Esq.

David Robertson, Esq.

Hugh F. Sandeman, Esq.

James Smith, Esq.

Daniel Stoddart, Esq.

The distinguishing features of this Corporation are UNQUE-

TIONABLE SECURITY, LOW RATES OF PREMIUM, and a combination of all the important advantages hitherto offered to the Public both in the Fire and Life Department.

FIRE DEPARTMENT.

Fire Insurances effected at reduced rates, and Policies may be transferred to this Office without Extra Charge, and on terms very favourable to the Assured.

Insurances falling due at Michaelmas must be renewed within Fifteen days from that date, or they will become void.

LIFE DEPARTMENT.

This Incorporation effects life Insurances either at Reduced Rates without Profits, or with Participation in Profits, of which two-thirds are returned at regular periods, without being subject to any deduction for charges of management.

Tables of Rates and every information may be had at the Company's Offices; or of the Agents throughout the Kingdom.

F. G. SMITH, Secretary.

No. 49, West Strand.

And No. 74, King William-street, City.

## NATIONAL LOAN FUND LIFE ASSUR-

ANCE and DEFERRED ANNUITY SOCIETY, No. 24, Cornhill, London.—Capital, £1,000,000.

Empowered by Act of Parliament.

Patron—His Grace the DUKE of SOMERSET, F.R.S.

Directors.

T. LAMIE MURKIN, Esq. Chairman.

Col. Sir Burges Camac, K.C.S.

John Elliott, M.D. F.R.S.

John Gooden, Esq. Ald.

H. Gordon, Esq.

Robert Holland, Esq. M.P.

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